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SOIL CONSERVATION

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SOIL CONSERVATION

CLINTON P. ANDERSON
SECRETARY OF AGRICULTURE

HUGH H. BENNETT
CHIEF, SOIL CONSERVATION SERVICE

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WELLINGTON BRINK, EDITOR

CONTENTS

Front Cover: Proud sire of the herd. It takes sound management of the range to make profitable beef. Carrying capacity must be carefully gauged, stocking controlled, rainfall conserved, good grasses encouraged. Improved range means more beef.

(Photo from FSA.)

SOIL CONSERVATION is issued monthly by Soil Conservation Service of the United States Department of Agriculture, Washington, D. C. The matter contained herein is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business, with the approval of the Director of the Budget. SOIL CONSERVATION seeks to supply to workers of the Department of Agriculture engaged in soil conservation activities, information of special help to them in the performance of their duties. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., 10 cents a copy, or by subscription at the rate of $1.00 per year, domestic; $1.50 per year foreign. Postage stamps will not be accepted in payment.

New York City Schools Lead the Way

By William W. Reitz

Andrew S. Wing, executive secretary of the National Garden Institute, here presents Institute's certificate to Marvin M. Brooks, Director of Nature Study and School Gardens of the city of New York and to Radio Station WNYE. Left to right: William W. Reitz, who presented Soil Conservation Service certificate to the Station; Mr. Wing, Mr. Brooks, and James S. Macandrew, WNYE's coordinator of programs. Brooklyn Technical High School is the only school in the United States offering a soil conservation program by radio.

IF YOU had asked me a few months ago to nominate the most unlikely place in the world to hear soil conservation talk I would have said: "The sidewalks of New York."

And I would have been dead wrong.

Since last fall the sidewalks of New York have been buzzing with soil conservation talk as the kids who use them for their playgrounds launch into a city school system course in conservation.

The enthusiasm that this course has aroused in these city children is astonishing, and moving. Of this we can be sure: tomorrow's citizens of the world's largest city will have no doubts as to their stake in soil conservation if such courses are continued.

The Department of School Gardens and Nature Study is ideally set up to bring the conservation story to New York's children. In each school in New York's five boroughs a teacher acts as Nature Study Curator, supervising nature-study activities and instruction, usually in a room provided for nature-study activities. Some schools have nature-study clubs. A number of high schools have nature-study centers with a teacher in charge, and the services of this teacher are extended to elementary schools within the district. Classes from the elementary schools come to the center for a half day at a time.

To dramatize further the instruction given at the center, classes are taken for a nature-study hike through one of the city parks. Sixty-two of the city schools have school gardens, with a teacher in charge.

Conservation is taught imaginatively and accurately under the direction of Marvin M. Brooks, Director of School Gardens and Nature Study. The courses were launched at packed meetings which drew not only the nature-study curators and school garden teachers but representatives from the elementary, high school, and vocational departments of the administrative staff of the city school

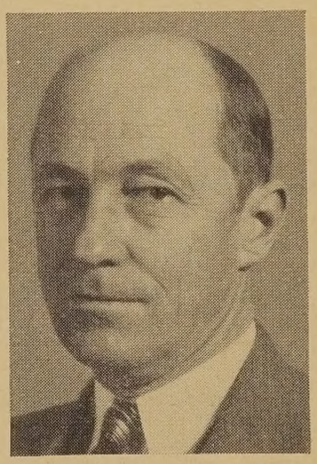
system. On hand to discuss soil-conservation education were William C. Pryor, head of S. C. S.'s Education and Publications Section at Washington, and myself as head of the Education Relations of the Upper Darby Regional Office. U. S. Department of Agriculture literature containing information on soil and water conservation, and other sources, were outlined. The teachers were also advised of motion-picture films, lantern slides, film strips, and photographs that could be supplied by the Soil Conservation Service. That the value of these was instantly appreciated is shown by the constant flow of requests to the regional office for this material.

The cause of soil conservation is also fortunate in that Mrs. Minna S. Blatt, Visiting Teacher in Nature Study, is an ardent conservationist. Mrs. Blatt, employed by the city school system, has offices with the National Audubon Society, which has made its facilities available to her, including its literature. Mrs. Blatt calls on schools and renders assistance in teaching nature—and conservation. She advises on soil and water conservation teaching aids and has supplied a great deal of conservation literature to teachers.

The soil-conservation course took to the air in a series of five radio broadcasts to the city schools. The broadcasts, entitled "Soil is Life," were broadcast at 11:45 a. m. each Friday from March 15 to April 12 over WNYE, the Board of Education Station, and WNYC, the Municipal Station. They were rebroadcast at 2 p. m. each Monday via Frequency Modulation over WNYE. Mr. Pryor made the first broadcast and I handled the later ones. An informal audience-participation atmosphere was created by having students from different high schools present at each broadcast to hear the S. C. S. representative first discuss problems of soil conservation, then answer questions.

At the last broadcast the Soil Conservation Service presented a citation to Radio Station WNYE for staging the broadcasts, and gave another to the Board of Education for being the first large city to establish such an extensive course in soil conservation. But the Radio Station, Board of Education, and S. C. S. representatives present at the ceremony felt that the best citation of all could be read in the pleased faces of this audience of city children.

Nichols Heads Engineers



NEW president of the American Society of Agricultural Engineers is Dr. Mark L. Nichols, Assistant Chief of the Soil Conservation Service, where he is in charge of research.

The new head of the society is the originator of the popular Nichols terrace. He made important research contributions on soil dynamics during World War II which were valuable to Army Ordnance. He was a member of the technical secretariat of the United Nations Food and Agriculture Conference at Hot Springs, Va., in 1943. He is a representative of the Department of Agriculture on the National Research Council, and a member of the United States Civil Service Committee of Expert Examiners. He was the first chairman of the southern section of the American Society of Agricultural Engineers, which he organized. In 1934 Dr. Nichols was the recipient of the McCormick Medal, awarded annually for outstanding contributions to agricultural research.

Soil Conservation as a Teacher

Supervisors of the Bent County, Colo., Soil Conservation District are purchasing 20 subscriptions to *Soil Conservation* Magazine. These will be distributed locally where they will do the most good. Among those who will receive copies, as the gift of the district, are the vocational agriculture departments of the McClave and Las Animas high schools, the Las Animas Public Library, offices of doctors and dentists, and so on.

The Luling Foundation Agricultural School for Veterans serves Caldwell, Gonzales and Guadalupe Counties in Texas. Enrollment is 180. All students, according to a recent letter from Walter W. Cardwell, acting coordinator, "desire to receive instruction and practice in the latest agricultural methods and theories." *Soil Conservation* Magazine has been recommended by the faculty for reading that will help to bring these veterans up to date.

An Editorial by Betty Jo Poe

Old Words Come To Life

"Take away from man all that belongs to land, and he is but a disembodied spirit."—Henry George.

EVEN though people did consider Henry George a radical in his day, most of us now will have to admit that he knew quite a bit about land.

When people first started using a steam engine, they thought they had acquired a mighty slick method of generating power. When they ran railroads clear across the continent, there was more big talk about progress. Now they've got automobiles and airplanes and jet propulsion and split atoms.

But Henry George knew something about progress that not many people stop to consider. It was this—

"Material progress cannot rid us of our dependence on land; it can but add to the power of producing wealth from land."

And there he had it. He knew that it didn't make any difference whether you were a plowman, a shoemaker, a post-hole digger, a department store clerk, a range rider, or a school teacher, because as he put it—

"Land is the habitation of man, the storehouse on which he must draw for all his needs . . . for even the products of the sea cannot be taken, the light of the sun enjoyed, or any of the forces of nature utilized without the use of land or its products."

Obviously, Henry George believed that a lot depends on what happens to the land. He knew, for example, that if people were denied the bounty of nature, "equal political rights" would become an empty phrase. He also knew that people can abuse the land by not using it at all, and that they don't have any right to abuse something that is their's for only a little while, because he wrote this—

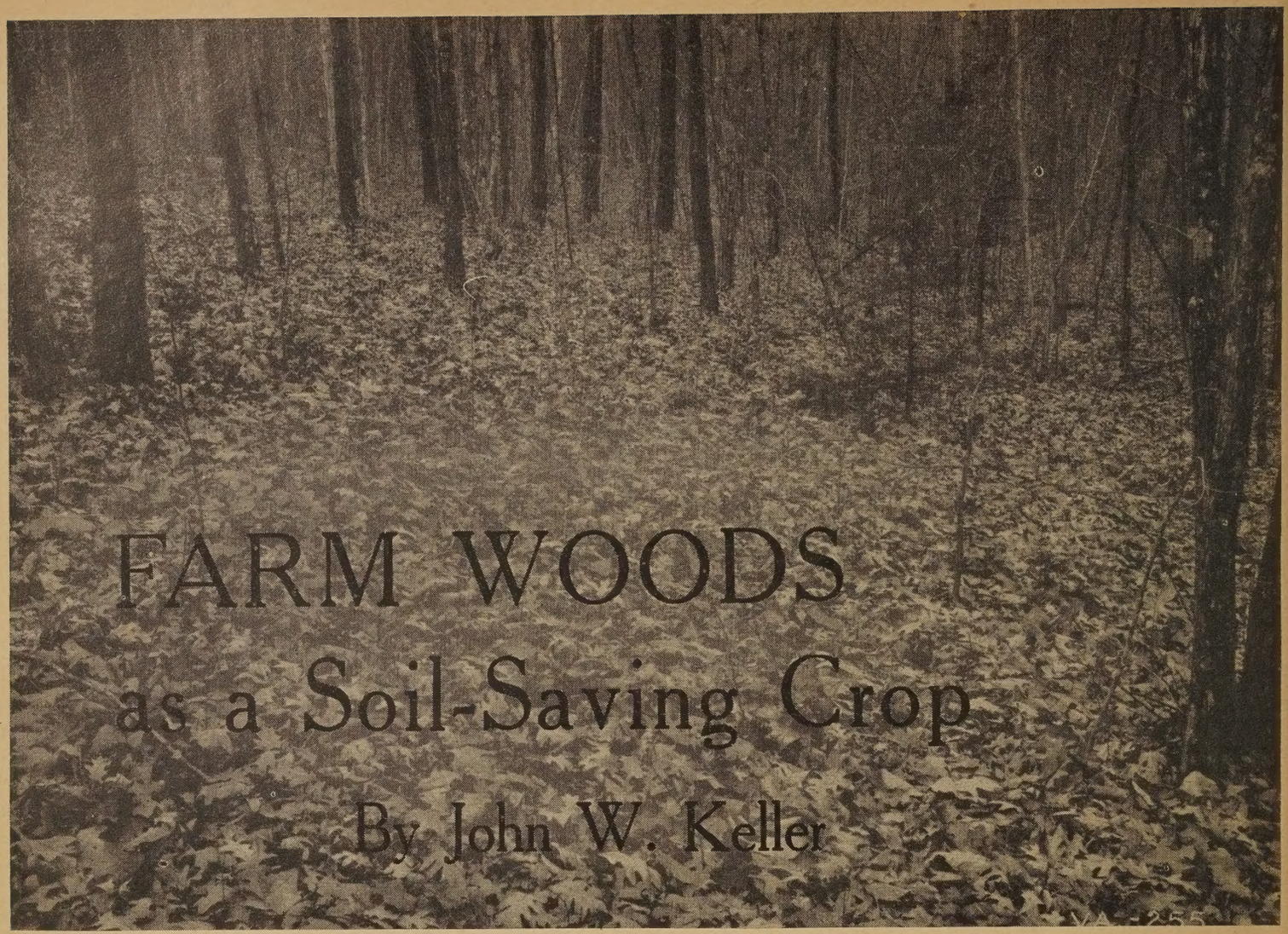
"If all existing men were to unite to grant away their equal rights, they could not grant away the right of those who follow them. For what are we but tenants for a day? Have we made the earth, that we should determine the rights of those who after us shall tenant it in their turn?"

The natives of New Zealand knew about this business too. When the white people came to New Zealand, they discovered they couldn't actually get a complete title to land from the natives. The natives argued that even though a whole tribe might consent to a sale, it could still claim additional payment every time a new child was born, on the grounds that they had parted only with their own rights and could not sell those of the unborn. The British Government finally settled the matter by buying land for a tribal annuity. Every child born into the tribe gets a share of the money.

If ours were as cohesive a society as that of the New Zealanders, maybe we, too, would worry about the rights of the unborn. It would be good if we even bothered to worry about our own rights, because they are involved in what happens to the land.

Actually, it's hard to think of anything you use that didn't come from the earth, isn't it? Imagine trying to get along without your stove, or your refrigerator, or your winter overcoat, or your roof!

So it might be a good thing to find out about the soil and water. You may be on your way to becoming what Henry George called "a disembodied spirit."



FARM WOODS as a Soil-Saving Crop

By John W. Keller

Undergrowth, litter and duff cover the forest soil and protect it from being loosened by raindrops, kicked about, and washed away.

SOME people have the mistaken idea that tree-covered soil is erosion free. Repeatedly, it has been averred that "forests are the perfect soil-and-water-conservation crop." It is even common to have administrative officials excuse the lack of woodland management practices by arguing that woodland soils do not erode. Actually, of course, only those farm woods which are well managed afford perfect erosion control, and a profit in the bargain. Woodland must be protected from fire and overgrazing so that its floor is covered with leaf litter and undergrowth. When the woods floor is kept undisturbed, the farm woods is an excellent soil and water-conservation agent. Where the floor is destroyed, the woods may become a means of lessening soil moisture and hastening soil erosion.

NOTE.—The author is Assistant Chief, Forestry Division, Soil Conservation Service, Washington 25, D. C.

Walter Ellison, research analyst, has shown that the erosion caused by falling raindrops varies with the size of the raindrop and its velocity. Take this principle into the farm woodland when a light rain is falling. Where trees are present the small drops fall gently to the ground. The striking power of each small drop is negligible. It cannot dislodge or separate the small soil particles. In the woods the small drops are collected on the leaves, twigs, and branches until they form drops large enough to separate and fall to the ground. The larger the raindrop and the higher on the tree it is released, the greater its striking power. The effect of one drop is not great, but the striking power or raindrop energy of a multitude of drops is enormous. The large drops fall to the ground and in the absence of forest litter they strike the unprotected soil time and again, dislodging fine soil particles. When the particles have been detached, the little rivulets can hold them in suspension and carry them away. Trees under these conditions do little, if any, good in conserving soil and water.

Overgrazing the woods is poor land use. If necessary to prevent injury to desirable seedlings, the woodlands should be fenced to exclude livestock.

During certain storms they may actually become agents of destruction.

An agent of soil erosion has been defined as "any power that detaches or transports soil particles." According to this definition we can have soil erosion without loss of soil. Frequently this

is the case in farm woodlands, where the constant hammering of large raindrops falling from tall trees kicks the soil particles about but does not remove them from the area. This shifting about interferes with germination of small forest tree seeds such as those of pine, spruce, ash, and tulip. The germinating seeds, exposed to sun and wind, soon die, and this leaves the soil to be taken over by more vigorous weed seeds. Without reproduction of desirable trees the farm woodland rapidly declines.

The importance of litter, duff, and small undergrowth cannot be overestimated. They cover the soil and protect it from being loosened by raindrops, kicked about, washed away. In addition, they act as a sponge to take up the rain as it falls and permit the water to be absorbed slowly by the soil with very little loss. Any factor that destroys or removes the forest floor helps soil erosion. Forest burning, overgrazing, and removal of pine "straw" from farm woodlands are destructive. They remove the best protection the woodland soil has.

A spectacular example of what can result from destruction of the protective forest cover occurred in December 1933 in southern California. Twelve inches of rain fell in a short period on 2 canyons, one of which retained its protective cover and the other had been burned. The unburned watershed was covered with chaparral, and there the rain did practically no damage. The flood waters swept out of the burned canyon and through a town, destroyed 200 homes and killed 34 persons. Protected woodlands help to dispose of water more economically and more fruitfully than does land devoid of woodlands.

Protection and care of the forest floor is an integral part of the woodland-management program. All necessary precautions must be incorporated into our plans. All persons around the farm should be careful not to start fires that may get out of control. Furthermore, every member of the family should be prompt to extinguish or report any fire that starts in or near the farm woodlands. In hazardous areas the construction and maintenance of firelanes, fire-tool caches, and organized fire crews may be necessary to keep

(*Continued on page 10*)

Farm woods can be the perfect soil and water conservation crop, if carefully planned, protected and maintained.

By G. C. GALE

MY DISTRICT AND ME

At right, Farmer G. C. Gale, the author of this article, who cooperates with the North Palouse Soil Conservation District; address, Palouse, Wash. At left, A. R. Moffat, of the Soil Conservation Service.

I STARTED farming in 1937, with very little experience or money. Three years I had attended the University of Idaho, taking physical education and shower baths, along with a general business course. After 4 years working for a grocery, I turned to farming. My only farming experience, except for a year or two as a harvest hand, was my wife's 8 years as stenographer for the Lewiston Grain Growers.

I started on the 415-acre ranch belonging to my grandmother. The AAA was going by then but there was not yet any local cooperation with the program. The land had been cropped very heavily and was in poor condition. The average wheat yield for the previous 10 years came to less than 20 bushels per acre. No livestock was being raised, no green manure utilized. Nor were there any other farm practices calculated to conserve the soil. I immediately signed with AAA and started a program of sweet clover and green manure rotation. I sowed 57 acres of sweet clover in the spring of 1938. It was not pastured or clipped, and the next year I plowed under a very thick, 6-foot stand of clover, disked it down in the fall and sowed fall wheat. I harvested 43 bushels of wheat per acre from this land, the one which undoubtedly was in greater need of green manure than any other on the ranch.

Naturally, I made it a point to be in on the meetings which led to the organization of the North Palouse Soil Conservation District. Later, I attended conservation school. At these informal classroom sessions, it was surprising to find I knew something of soil conservation—and yet there was so much more to learn. Indeed, the main benefit I derived from this program was the desire to learn. I was made to realize that with very little effort the average person became versed in soil conservation practices. The district soil conservationists were able teachers, willing to discuss individual problems, and help in every way.

After my first success with sweet clover, and on the suggestion of local soil conservationists, I started sowing sweet clover and peas together. Then I changed over to pasturing sweet clover in early spring and summer, and plowing under the remaining stand just prior to harvest, with very good results. This green manure program I have worked into a 5- or 6-year rotation until I have virtually covered the entire ranch.

In view of the higher price of peas and the natural tendency to increase acreage, I rather expected the farm plan, prepared by the Soil Conservation District, to fall somewhat by the wayside. Much to my surprise, in checking with one of the field men, I found that I unconsciously stuck to the outline.

NOTE.—The author is a farmer at Palouse, Wash. He is in the North Palouse Soil Conservation District.

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To set up a still more diversified scheme of farming and to enable me to do a better soil conservation job, I am now undertaking to build a small herd of registered Herefords. That means that I must provide more hay acreage and semipermanent pasture. These facilities ought to work in very well with the soil conservation program in utilizing sweet clover pasture and in making use of comparatively poor land for hay and grass.

I work the farm as much on contour as possible—a natural tendency for the average farmer. I do everything I can to utilize crop residue. As an experiment, I am now using a heavy disk on dry fall stubble. After the fall rains have softened the ground I subsoil this disked-under stubble with a rotary subsoiler. I plan to follow this practice in preference to fall plowing with a moldboard. I've tried out duckfoot sweeps to handle green manure. They've worked pretty well. And I plan to continue using the duckfoot sweeps or plows with modified moldboard.

I've used a variety of equipment made available by the district. I graded 4½ miles of waterways with a district grader. I filled in some of the bad washes, using a tumblebug. A grass-seeding drill enabled me to sow brome grass with my sweetclover. At the suggestion of our local soil conservation head, I went over my already sowed pea ground with this drill and put the grass seed and clover in the ground, where beforehand I had broadcast sweetclover right along with my pea-sowing operation. As a result, I obtained a good catch on my stand of sweetclover and grass in the dry season of 1944.

Another advantage derived from the district has been the hearty cooperation of the county commissioner. After I graded my waterways, the road gang tore out a silted-in culvert and replaced it with a new cleaned-out water pass. My neighbors have continued the waterways, grading on down through their fields—an advantage to all of us.

My plans for the future call for changing my hay ground to that area which is most subject to erosion. I hope to develop two or three springs to hold down the waterway flow and to afford stock water. I want to rebuild my bad fences and clean up the weeds and other nuisances that go with poor fence conditions. I will, of course, continue the use of sweetclover as a green manure crop. I am quite aware, with the increase of cattle I have on hand, that I will have more animal manure for spreading on the fields.

Let me summarize, in closing: The North Palouse Soil Conservation District has helped to educate me not only in conserving soil, but also all-around good farming practices. It has opened my mind to many new ideas. It has given me a plan to work toward—and planning goes a long way in any business. It has helped me to conserve the assets of the ranch, and to rebuild the depletion. This not only assures the value of the farm for the land owner, but it also assures the income for both the land owner and the renter. The diversification that ties in with our local conservation program also helps toward this end and makes for a better balance of the entire farm enterprise. I find that a lot of conservation practices improve the appearance of one's farm. Finally, the association I have had with our local conservationist and with the district supervisors means a lot to me, as do the friendships developed through mutual interest in the district program.

Farm Woods

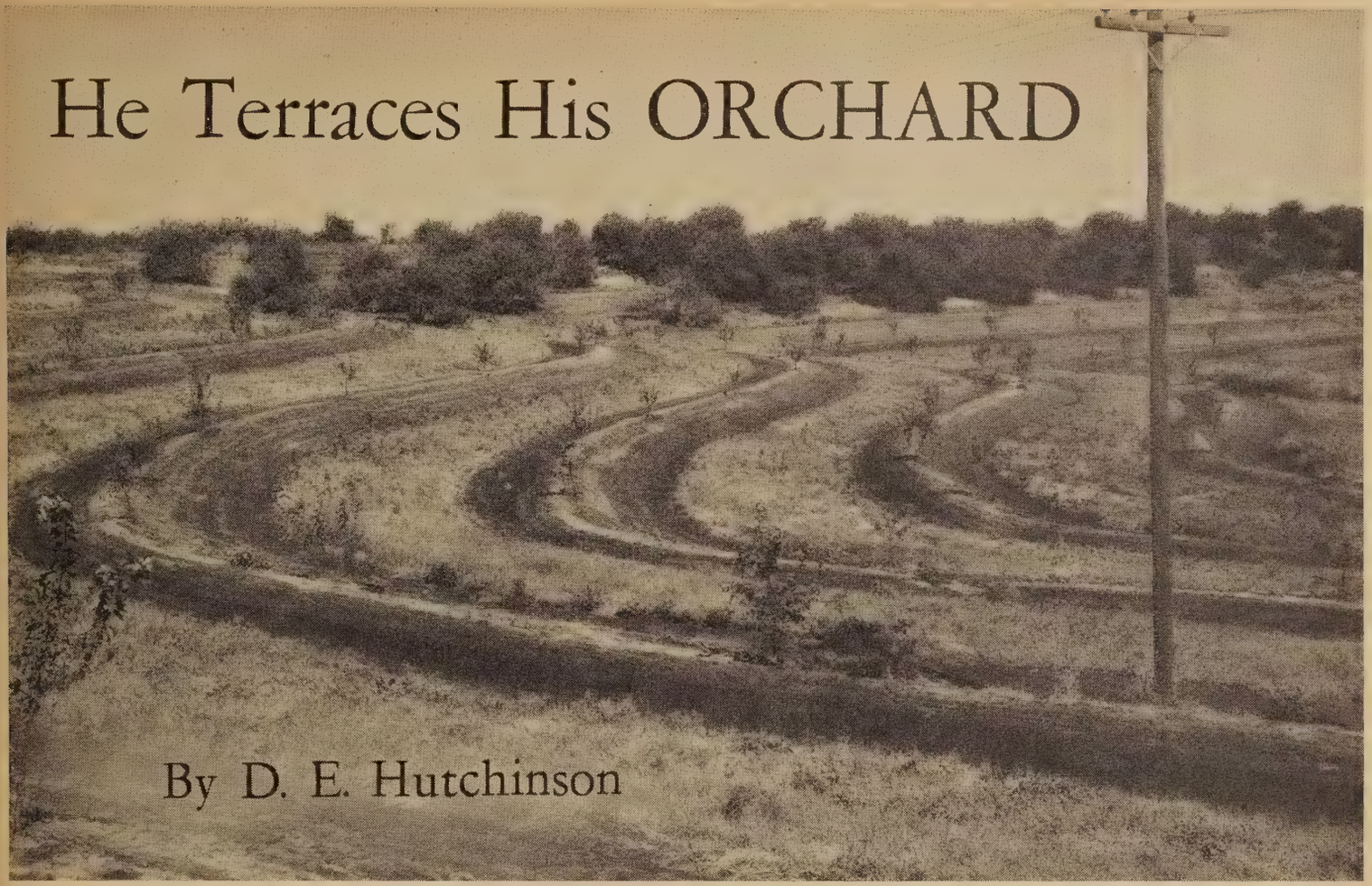
(*Continued from page 8*)

forest fires under control. Overgrazing is poor land use. Woods grazing, if permitted at all, should be controlled so that desirable seedling trees can get started and make good growth. If necessary to prevent injury, the woodlands should be fenced to exclude livestock.

Protection for farm woodlands will cost effort and money. Good management, however, will bring financial returns well repaying the costs of protection. When properly managed, the farm woodlands will net the farmer as much as any other field. Where necessary, he should plant trees so that every part of his woodland will be producing. He should harvest the mature trees and should remove the crooked and defective ones and those of inferior kinds, thus giving the best young trees a chance to grow. If he would get the highest returns from his woodlands, he should do some cutting every year. Then he will be growing wood as a farm crop and can count upon an annual income from his farm woodlands.

Farm woods can be the perfect soil-and-water-conservation crop, but only if they are carefully planned, protected, and maintained.

He Terraces His ORCHARD



By D. E. Hutchinson

R. P. KIMMEL, near Nebraska City, Nebr., is getting a lusty growth in his new orchard planted on old orchard land. That will raise no eyebrows in some parts of the country, but in many parts of the Great Plains it has been definitely not the thing to expect. Experience in those places was that the trees deplete the subsoil moisture. But conservation farming changes the picture.

"The trees here have grown a great deal more rapidly than in replanted orchards where conservation farming is not practiced," Kimmel said. "Here on this farm also there are differences depending on the conservation practices used. To get results, one has to give the land the treatment it needs.

"For instance, the trees on the steeper slopes have been planted on terraces. They have done much better than those on more nearly level land, where only contour planting was practiced. The reason seems to lie in the greater amount of moisture conserved. The contoured land slopes but little, but a good deal of the water runs off."

Kimmel stood among his terraced trees while he talked. Rising well above the height of the average man, the trees "show only part of their growth because we pruned them back heavily this spring." The trees planted first will bear this season; the others must wait a year or two.

During the time the trees need cultivation, Kimmel lets grass grow in the intervals between terraces. After the trees become larger, he lets the grass take over in the terraces and works the land between, growing legume crops there. This picture shows part of the surviving old orchard in the background.

The 100-acre farm, which Kimmel bought in 1925, is devoted wholly to orchard and vineyard production . It is in the heart of the eastern Nebraska fruit-producing area, in the so-called Loess Hills. The wind-blown soil is fertile and relatively deep. Slopes are steep and none too regular. On Kimmel's farm they range up to 20 percent.

Necessity for replanting part of his land came on Armistice Day in 1940. A freezing blizzard swept over the territory on the heels of balmy autumn weather. Temperatures plummeted from near summer highs to near zero. Orchards were hit hard. Later, when he could assess the storm's damage, Kimmel found that more than a third of his orchard had been killed.

Today, he has 20 acres of apple trees on terraces, 10 acres of apple trees, and 8 acres of cherries on

NOTE.—The author is extension soil conservationist in Nebraska.

the contour but without terraces. He developed grass waterways with the aid of Soil Conservation Service technicians.

Kimmel's present conservation plan was begun after the freeze as an Extension-Soil Conservation Service demonstration. Later he incorporated the plan in a cooperative agreement with the Otoe Soil Conservation District which the farmers organized late in 1941. Waterways came first, then terrace construction.

Some disadvantages are pointed out by Kimmel. The number of trees per acre is slightly less than in straight-row plantings. Maintenance of the down-hill slopes of the terraces is not too easy. And until improved equipment is developed, spraying will be more of a job. This is true also of orchard land which is contoured but not terraced.

The scales tip heavily on the side of the advantages, however.

"There is no doubt that the terraces prevent the loss of soil and fertility by controlling run-off," Kimmel explains, pointing to scars still evident where run-off after heavy rains had started to cut up the land. "If gullying hadn't been stopped, this land would be hard to work. Probably harder to handle than the terraces. Uncontrolled run-off also carries away some of the fertilizer.

"Then, too, the terraces conserve a lot of water. Under several hard rains not much water got away. Most of it was soaked into the soil where it could help the trees. What water did escape was handled by the waterways.

"The growth of the trees is pretty good evidence of what this means. Contouring alone has helped, but it doesn't hold back the water as well as the terraces, and I'm afraid that some of the fertilizer leaves with the run-off. At any rate, the trees have grown best on the terraced land, even though that land is also the steepest."

Although his present plan is relatively new, the conservation idea is not new to Kimmel. He has worked with Nebraska College of Agriculture and Extension Service people in the hunt to improve operations ever since he bought the farm. The use of cover crops and commercial fertilizer is of long standing and carries over into the present plan.

"I have clover between the rows of trees on the first 15 acres I terraced," Kimmel said. "This is to provide a mulch and green manure. The land between the tree rows remains in grass during the years when the trees on the terraces need a good deal of cultivation. Then after the trees are large enough and terraces are stabilized, I let the grass take them over, and work the space in between. I'll probably plant a cover crop next year on this newer terraced land."

Back in 1935, Kimmel built basins below most of his trees. They were crescent shaped and connected, so that the trees could be irrigated with water pumped from a nearby creek. Kimmel has discovered since then that the basins are effective in catching run-off water.

"The basins do the same as terraces in holding back run-off," he said, "but they are not so handy, nor do they have waterways to get rid of the excess. If they overflow, the water spills over the tops. They are harder to maintain, and the land where basins have been built is harder to work than terraced land. On the other hand, the terraces will serve just as well as the basins when it comes to irrigation."

Experience with the basins, however, bolsters Kimmel's confidence. The long-time results have been good. The trees were just coming into bearing when the basins were built, so there are no previous yields for comparison. Nevertheless, Kimmel attributes much of his success in producing high-quality fruit to their influence.

For the present, the rapid growth of the new trees means much in repairing the damage done by the 1940 freeze. Larger trees usually mean greater fruit production per acre. Where previously the hope for tree growth had not been glittering, Kimmel is reaping the cumulative rewards of previous and present conservation operations. There was ample fertility and moisture in the soil to give the trees a good start, and most of the moisture that has been received since then has been saved.

Visitor from Africa

In the United States to study soil and water conservation is C. J. J. Van Rensburg, of the Union of South Africa. Mr. Van Rensburg has spent 21 years in his country's Department of Agriculture, where he is in charge of pasture research stations. He is an authority on the agriculture of his homeland, and has given special attention to soil erosion and its control. When Hugh Bennett, chief of the Soil Conservation Service, visited South Africa some months ago for a study of the land and its problems of soil erosion, drought and food shortages, Mr. Van Rensburg accompanied him on his inspection.

Jig-Saw Farm Plan

By Alfred M. Hedge

The maps, left to right: Farm before planning; colored cut-out depicting use-capabilities of land; completed conservation plan, with Mr. Hedge about to put in place an area devoted to kudzu.

NOW and then a new device appears that is widely useful in telling the story of soil conservation. Such a device is the jig-saw cut-out of a farm plan.

This idea for the cut-out came from a Forest Service representative speaking at a meeting attended by Soil Conservation Service personnel in Atlanta, Ga. He used a jig-saw cut-out to illustrate a talk on thinning woodlands. That the cut-out could be used very effectively to illustrate farm conservation plans was immediately apparent to Regional Conservator T. S. Buie. He asked M. W. Lowry, Barrington King, and F. M. Orsini, to adapt the idea to farm conservation planning when they got back to their Soil Conservation Service office at Spartanburg, S. C. They did, and the result is pictured here.

This jig-saw cut-out is a particularly effective device for showing how conservation practices tie in with land use capability classes. It shows what the farmer will have when a farm plan is finished. It is also excellent as a visual aid in teaching soil conservation in schools.

Those who have used this device warn that it takes considerable practices to use it effectively. The speaker must be sure that the various pieces of the map—and his talk—fit exactly. If he stumbles or gets confused as he talks it detracts considerably from the presentation.

To be most useful the cut-out should be of a local conservation farm plan. Care should be used in selecting a farm plan for this purpose that is as simple as possible. It should show the desired information clearly. Small divisions in land use capability classes and land uses should generally be avoided. The easel on which these cut-outs are mounted should be slightly tilted. In that position the cohesive qualities of the flannel backing on the maps and the flannel sheet used on the easel will cause the pieces of the cut-out to stick in place without the use of thumbtacks, tape, or other means. Care should be used to see that the easel is not set where a draft or breeze from an electric fan can pick up the pieces and blow them off the sheet.

After the farm has been selected, prepare three

NOTE.—The author is chief of the project plans division, Soil Conservation Service, Washington 25, D. C.

photographic enlargements to the desired size, maintaining uniform scale in all three enlargements. Transfer the outlines of the land use capability classes to two of these photographic enlargements. A pantograph or projector if available is helpful in this operation. On both these enlargements cut out the map along the lines of the land use capability divisions.

A sharp razor blade or knife held perpendicular to the sheet does the trick. Use cotton flannel to back the various cut-outs. Trace the individual pieces on a large piece of flannel, then cut the flannel smaller than the individual piece outlines to allow for stretching when the flannel is mounted. On large pieces one-half inch allowance should be made for stretching and on the smaller pieces one-fourth to one-eighth inch is sufficient.

Next, glue the flannel pieces to the cut-outs, using a good grade of rubber cement. Other glues tend to warp the paper. Apply the cement smoothly to the back of the aerial photographs and attach the flannel before the rubber cement is dry, smoothing on from the center out.

Color one set of the land use capability class cut-outs, using the standard colors, and leave one set uncolored. Thoroughly clean the face of the photographic pieces. California inks are recommended for coloring. Be sure to allow the colors to dry thoroughly before handling.

You now have two enlarged aerial photographs of the farm which have been cut out in jig-saw fashion along the lines of the land use capability classes. One set of cut-outs is plain and one is colored according to land use capability class designations.

The land use as planned and the physical features such as roads, streams, houses, etc., are marked on the third enlargement of the farm. This enlargement is then cut out on field boundaries, or subfield boundaries, whichever is most practical. Suitable photographs of land use practices can be enlarged and placed on the appropriate fields where they belong. Care should be used to enlarge only those photographs with good detail so that the audience can tell at a glance whether sericea is pictured, for example, or kudzu. Cut out the land use map and attach flannel as explained for the land use capability class maps. When the land use map is prepared in this fashion the entire device is ready for use.

The fields are then discussed as they were before the farm was planned for conservation operations. In describing the soils and capability classes found on the farm an individual piece of the plain map may be replaced with the corresponding piece of the jig-saw that has been colored to represent the land use capability class being described. At the end of this discussion the plain map of the farm before planning will be completely replaced with the map showing land use capability classes, and you will find that most of your audience has closely followed every step.

You are then ready to proceed to a description of how the farm should be planned, and how the land use capability classes are used in making this plan.

By using the cut-out the speaker can focus the attention of his audience on a particular feature of the farm he is discussing and still relate it to the whole farm and to associated problems. The land use map can be built up field by field. The land use capability map can be referred to in showing why the various fields should be planned for a particular land use, rotation, and supporting practice.

In addition to showing a farm conservation plan as illustrated, other pertinent information can be prepared in the same manner and as supplemental illustrations. For example, cards showing farm organizations "before" and "after" planning can be used to more completely describe the effects of the conservation plan.

There are numerous uses to which this idea is adaptable in addition to the one illustrated here. The construction of terraces, drainage, and irrigation system, range and pasture improvement, woodland practices, and a host of others could be clearly illustrated by jig-saw cut-outs from appropriate photographs.

As a teaching device, for either youth groups or adults, this idea has proved to be very effective. It has the added advantage of being compact, easily carried and capable of being quickly set up anywhere that a slightly sloping surface is available on which to mount it.

LEGUME BACTERIA in soil conservation

By T. M. McCalla

Sweetclover produces several tons of organic matter per acre, furnishes soil cover to control erosion by wind and water, and supplies available nitrogen. (Photo courtesy F. L. Duley.)

MANY leguminous plants furnish a soil cover, reducing water and wind erosion of the soil. The use of kudzu in the South is an example of what a legume will do to stop erosion and rebuild soil fertility. Although some legumes, such as soybeans, do not give the soil much cover or protection against erosion, legumes in general supply available nitrogen and organic matter to the soil. This enables succeeding crops to grow better and furnish more cover. To grow legumes successfully and to realize the benefits of nitrogen fixation, a number of soil treatments and management practices are required. It is my purpose here to point out the role, behavior, and needs of legume bacteria in association with the legume plant in furnishing fertility for the growth of plants to make a soil cover.

On the roots of the legume plants are numerous nodules of various sizes and shapes, each acting as a nitrogen-fixing factory. In these nodules are millions of tiny, rod-shaped bacteria living in association with the plant tissue. The bacteria and plant tissue together are capable of taking atmospheric nitrogen and transforming it into an organic form usable by the plant. The bacteria not only perform this service gratuitously but also actually pay for the privilege. The exact nature of this wonderful mechanism is not known, but recent research points the way to an early understanding of it. Industrially, atmospheric nitrogen is fixed at tremendously high temperatures and pressures. In the nodule, nitrogen fixation is accomplished at normal temperatures and pressures.

Legume bacteria are minute, rod-shaped organisms, in most instances. They are about 1/25,000-inch in diameter and 1/5,000-inch in length. They occur in morphological forms known as rods or normal forms, and in round or odd-shaped forms which are called "bacteriods." The exact significance of these bacteroid forms in nitrogen fixation is not known. The legume bacteria move by organs of locomotion called "flagella." Some have one flagellum while others have many. The le-

NOTE.—The author is bacteriologist, Soil Conservation Service—Research, cooperating with the Nebraska Agricultural Experiment Station, Lincoln, Nebr.

gume bacteria move rapidly in liquid media, but it is doubtful that they move much in the soil by their own locomotion. Probably dissemination of legume bacteria is accomplished largely by wind, water, and insects.

The legume organisms are divided into two groups based upon their ability to grow on artificial media. One group grows rapidly and the other slowly. The rapid growers are represented by pea, bean, and alfalfa groups. The slow growers are represented by cowpea and soybean groups. The legume bacteria as a rule are prodigious gum formers.

The growth of legume bacteria may be inhibited by certain microorganisms, while other groups stimulate their growth. Legume bacteria grow well in a medium containing essential mineral elements, a source of carbon, and accessory growth factors from plants. They may be carried for long periods of time on this medium without losing their ability to nodulate legumes or to fix nitrogen.

One important question arises as to whether legume bacteria can fix atmospheric nitrogen in the absence of a host plant. Some investigators believe they can, whereas others think they cannot. However, at the present time the concensus is that the legume bacteria do not fix atmospheric nitrogen in the absence of the host plant. Thus, the replenishment of soil nitrogen by the legume bacteria unassociated with legume plants cannot be counted upon.

Legume bacteria are destroyed by direct sunlight and dessication. Since sunlight affects only those organisms in the immediate surface of the soil, the effect on the total number in the soil is negligible. Although they do not form spores, some of the legume organisms are able to resist drying for long periods of time.

Nodules are located on roots of legumes. They may be large and clustered about the tap root, as with soybeans or cowpeas. They may be scattered about on the lateral roots, as with alfalfa or vetch. They may be round, clustered, or oblong in shape. Enlargements on the roots or false nodules caused by nematodes do not fix nitrogen.

The root hairs are infected at an early stage. By the time the plants are 1 to 2 weeks old they may have a number of nodules fixing nitrogen. From this time on, the amount of nitrogen fixed per time unit increases in quantity. Intermittent periods of dry weather may cause the nodules to dry up with a cessation of fixation. Eventually,

Growth resulting from inoculation of chick-peas. Left, not inoculated; right, inoculated. (Photo courtesy of C. D. Moodie and S. C. Vandecaveye.)

nitrogen fixation ceases as the plant matures. A considerable portion of the nitrogen fixed in the nodules is used by the plant in the growth process.

A legume plant nodulated with an efficient strain of bacteria has a dark green color and makes vigorous growth. The non-nodulated plant in a soil deficient in available nitrogen is yellow and stunted.

Legume bacteria are responsible to environment. In a medium deficient in lime the organisms may change to colored forms incapable of producing nodules. A liberal application of lime may cause the legume bacteria to become normal in color and nodulating ability. Lack of any essential mineral element such as phosphorus, potassium, boron, or others results in inefficient or no nodulation. Soil fertility conditions with respect to all elements except nitrogen should be corrected before legume seeds are inoculated and planted. A non-nodulated legume will not increase the total soil nitrogen. The manurial value of a legume without nodules would be the same as for any non-legume.

The value of a legume is based upon its ability in symbiosis with the bacteria to fix atmospheric

nitrogen and to supply the nitrogen to the plant and the soil. Growing a legume that does not fix nitrogen will not result in better plant growth or soil improvement. The same results could be achieved by growing a nonlegume.

Legumes may use available nitrogen from the soil and not fix atmospheric nitrogen. The process of nitrification may supply a considerable portion of the nitrogen needs of the legume. This may reduce the need for nitrogen fixation to a considerable extent.

Under some conditions it has been found advantageous to apply light applications of nitrogen to soybeans at the time of planting. The soybeans may benefit from the available nitrogen in the fertilizer or through nitrification before the nitrogen fixation process gets under way.

Sometimes the soil does not contain the proper legume bacteria. Under these conditions the seed should be inoculated with the proper group of organisms. Legume bacteria are divided into seven inoculation groups, namely: (1) alfalfa, (2) clover, (3) pea, (4) bean, (5) lupine, (6) soybean, and (7) cowpea. Before the legume seed is planted, it should be inoculated with bacteria from the proper group. Land that has grown the particular legume recently probably will not need inoculated seed.

There are two methods. Either the seed or the soil may be inoculated. Usually it is less trouble to inoculate the seed. Seed inoculation may be accomplished by mixing the seed with soil known to contain the proper organisms, or with pure cultures of the organisms. Pure cultures are distributed on agar in bottles, on peat, or some other humus material. Any of the methods is satisfactory for the distribution and storage of pure cultures. If there is any doubt about the need, it is usually good insurance to inoculate.

When legume plants and bacteria are grown in a soil with adequate mineral nutrients present, 50–150 pounds of nitrogen per acre may be fixed annually. This is only a small amount of the total atmospheric nitrogen over an acre of land. The nitrogen fixed in the nodule is immediately available to the plant. Some of the nitrogen goes into the roots and some into the plant tops. Inoculation of the seed may increase crop yields considerably. The increase in yield will be dependent upon the presence of proper bacteria and the nitrogen available in the soil. In 1945 soybean yields in Nebraska were increased 3 bushels per acre by inoculating the seed, as shown by the Nebraska Grain Improvement Association.

The time of returning the legume to the soil is important in the use of the crop as a green manure. The plant material turned back to the soil decays and releases through nitrification the nitrogen taken from the air and the soil. The rate of decay and the release of available nitrogen depends on the succulence of the plant, the percentage of nitrogen, and the available carbohydrates. The nitrifying rate of the legume varies with the age of the plant. At an early stage of growth the plant is high in percentage of nitrogen. If sweetclover is plowed under when it is 12 to 16 inches high, the nitrogen is converted rapidly into nitrate. As the plant grows older the percentage becomes smaller, but the total plant material and, consequently, the total nitrogen increases.

Legume bacteria may change considerably after producing nodules on the plant for a season. At times legume bacteria may become more effective in nitrogen fixation by plant passage. Under other conditions, however, repeated passages through a host plant may result in successively less effective strains, until after several passages, the bacteria may produce numerous nodules without fixing much nitrogen. Actually, plants inoculated with ineffective strains of bacteria may have more may produce numerous nodules without fixing nitrogen. Because of this, the number of nodules on a plant cannot necessarily be considered as a criterion of nitrogen fixation. Usually a few large nodules clustered about the tap root indicates a plant that fixes large amounts of nitrogen.

Generally there is quite a large variation in the amount of nitrogen fixed by different strains of legume bacteria. Thus, it is necessary to see that the seed is inoculated with the most efficient organisms. If there is any question about the soil having good strains of legume bacteria, it is advisable to inoculate the seed with reliable cultures.

The legume bacteria are attuned to the level of nutrients used by legume plants and must have organic materials as a source of energy and carbon. Despite the exacting nutritional demands of these organisms, they may persist for several years in the soil in the absence of the host plant. If 10 years or more have elapsed since a legume of the same inoculation group has been grown on the land, the seed should be inoculated.

Legume bacteria do not produce nodules or fix nitrogen in soils too acid. However, the limiting

pH ranges from 3 to 5 with the different groups of legumes. There is a close relationship between nitrogen fixation and calcium content, and a reciprocal relationship exists between nitrogen fixation and the hydrogen ion concentration of the soil. If the soil is deficient in lime, phosphorous, potassium, or boron, these fertilizers should be added to the soil before the legume is planted.

Legume bacteria have a disease called "bacteriophage." Under some conditions, bacteriophage may cause a cell destruction or disintegration of the nodule bacteria in alfalfa. When the bacteria are killed in this way, the nodules of alfalfa are rendered ineffective in nitrogen fixation, according to some investigators. Secondary growth of organisms or new strains introduced by inoculation may overcome this difficulty. There seems to be some question as to the magnitude of the bacteriophage in causing the deterioration of alfalfa stands.

Legume and nonlegume, such as alfalfa and bromegrass, grow together in certain localities so efficiently as to encourage the practice of planting them together. The beneficial association of legumes and nonlegumes seems to be other than the excretion of nitrogenous substances by the legume-root nodules directly into the soil for the use of the nonlegume. Nodules or roots may decay during the period of growth or during the following year. The nitrogenous material may be transformed eventually to nitrates which will increase crop growth.

Legumes properly inoculated will fix atmospheric nitrogen, which in turn will feed plants with available nitrogen to furnish a soil cover for erosion control. The legume plant furnishes nitrogen not only for its own use but for the succeeding crop as well. This addition of available nitrogen induces the growth of more cover and protection to the land. Much of the benefit of legumes in soil erosion control comes from their influence on soil fertility, stimulation of succeeding crops or associated crops, such as bromegrass.

Waterways or eroded areas to be seeded to grass and legumes may need the addition of lime, phosphorus and potassium. The seed should be inoculated before planting to insure that effective nitrogen-fixing strains of legume bacteria are present.

Failure to obtain a good legume crop may be due to: (1) Lack of fertility elements, such as lime, phosphorus, boron, or others; (2) inadequate cultural practices, such as improper seedbed preparation or poor cultivation; (3) lack of legume bacteria or the presence of inefficient strains. The answers to these difficulties are obvious. The soil fertility should be adequate or supplied. The land should be properly prepared, and the seed before planting should be inoculated with good strains of bacteria.

To assure maximum benefit of legume bacteria to the legume plant in a soil conservation program, all land management practices of merit—such as liming and tillage—that influence nodulation should be inaugurated and carried out. Proper nodulation with efficient strains can be obtained by using reliable inoculants. If these things are done, profitable plant growth and an adequate protection of the land against soil erosion should follow. In addition to adequate erosion protection, soil organic matter and nitrogen will be increased also.

Increase in yield resulting from inoculation

Investigator	Crop	Percent increase in yield due to inoculation
J. F. Duggar, 1887, Alabama	Alfalfa	336
	Canada field pea	156
	Hairy vetch	186
H. R. Albrecht, 1943, Alabama.	Peanuts	[1] 65–841 lbs.
C. D. Moodie and S. C. Vandecaveye, 1943, Washington.	Chickpeas	29–74
W. D. Collins, 1943, Georgia.	Crimson clover	440
L. W. Erdman, 1943, Wisconsin.	Soybeans	4–15

[1] Increase in the yield of nuts as pounds per acre in 8 farmers' fields in Alabama in 1942.

Wildlife Fits the Farm

Dr. Ira N. Gabrielson, for many years director of the Fish and Wildlife Service and now president of the newly organized Wildlife Management Institute, is strong in his praise of the wildlife values of soil conservation. In a publication of the National Wildlife Federation, "Proposed Dams in Missouri River Watershed," Gabrielson stated:

"It may occasion some wonder that a fish and wildlife man is placing so much emphasis on soils and waters, yet a little thought must bring the realization to you as it has to us that without fertile soils and clean waters it is not possible for us to have either wildlife or fish in abundance. They are the products of these two elements, just as much as are farm crops and forests. We are convinced

that we cannot succeed permanently in protecting these resources and in providing them in abundance enough for utilization by man except by fitting them into the general economy, and especially the prevailing agriculture, of the region.

"Mention has been made of the desirability of starting flood control directly on the land where the rain falls. This conserves both soil and moisture, and when properly done it also aids in the restoration of wildlife. Game managers recognize that any improvement in moisture and soil fertility results in better conditions for game birds and animals. Such improvement is increased whenever soil conservation practices include the planting of vegetation that rates high as food or cover for wildlife. In planting to prevent erosion in gullies, along stream and ditch banks, and on contour strips, the Soil Conservation Service has wisely advocated the use of plants that produce seeds, berries, or other food for game animals. As a result, many farmers are now benefiting from increased numbers of quail, pheasants, rabbits and other upland game. Every farmer and sportsman knows that hedgerows usually harbor game. When such hedgerows are planted on contours and include wildlife food plants, they have a double value for wildlife restoration and soil conservation and at no added expense.

"This principle is being applied to all erosion-control planting recommended by the Soil Conservation Service, with the result that soil and moisture conservation is yielding multiple benefits, including increased numbers of upland game."

REVIEWS

THE COMPLEAT RANCHER. By Russel H. Bennett. 246 pages. Selected references. Rinehart & Co., New York, 1946.

According to the publisher's note, this is first of all a book for the man who has lived a life of action, who wants to continue it with a small ranch of his own and seeks information on how to get one. To Russell Bennett, a home on the range is not just a popular song, it is a whole philosophy. The charm of this book lies in the manner in which cattle ranching, as a way of life, and the job of raising livestock are presented in a harmonious combination of the practical and the picturesque. A rather "compleat" job seems to have been turned out on both. The book is not for the prospective sheep rancher and to this extent it falls short of living up to its title.

The volume offers an abundance of wholesome ranching advice for the beginner and it does so, fortunately, without the pedantry or disdainful air that some givers of advice gratuitously press upon the less well informed as the price of their gift. In fact, the appeal of this volume is not only to one contemplating the raising of cattle for profit but to any person interested in the practical and philosophic side of life in the range country.

In presenting the production of beef cattle from the cradle to the market place, so to speak, the book serves as a sort of handy guide to social and economic security for the prospective grower of beef on the hoof. After an introductory chapter or two on the range country and the apprenticeship which the novice must go through in getting acquainted with the country and its customs, the author deals extensively with the "critter"—cows, bulls, calves. The sequence of events in handling the herd on ranch and range is described, from breeding to calving and on to branding and round-up of the herd for sale of marketable animals or for the wintering of animals to be carried over. In the chapter on the ranch homestead, valuable pointers are given on the location, selection, construction, and upkeep of the homestead, including barns, corrals, and other necessary structures. The advantages of ranch life, as compared with urban life, are set forth in a refreshing spirit of philosophy, fortunately without preaching. The observation that security in ranching comes mainly as a result of full production is timely. Much the same solution is put forward by others for solving the economic pains of the country generally.

A separate chapter is devoted to fencing and haying. In the words of the author: "The range man of the early days reserved the deepest vials of his wrath for barbed wire"; also, one might add, for haying. However, both fencing and haying are shown to be essential parts of modern ranch operations. The importance of hay as a means of balancing the year-long operation of cattle production is emphasized as is the desirability of holding an ample supply of hay in reserve for unforeseen contingencies of bad weather and to make up for scanty forage in unfavorable seasons. These are examples of prudent ranch husbandry widely advocated by range conservationists and ranch planners.

A special chapter is devoted to the cow horse which, in his status as the rancher's working partner, is given the respect to which his accomplishments—or promise—entitle him. The good and

bad points of cow horses, their usefulness and value in the success of the ranching operation, are found to be no less important than the affection bestowed on his silent partner by the rancher and cowpuncher.

Ranching is not all hard or distasteful work; it has its lighter side, too. By necessity, ranch communities must create much of their own amusement, and, as the author points out, ranch recreations have a robustness and flavor all their own.

The conservationist will find much satisfaction in the chapter on ranch economics. Practical hints are given on the financial aspects of raising cattle. Handy rules of thumb are offered for determining how much money should be put into land and livestock, and some of the pitfalls to be avoided in building up the enterprise, stocking the range, and marketing the product are pointed out. The writer has not neglected the important bearing of range conservation on the success or failure of the ranch enterprise, although one could wish that he had laid even greater stress on the truth that most successful ranchers, be they great or small, come by sooner or later; namely, that balancing the number of livestock with the amount of forage produced each season is the key to keeping the range productive. In the words of the author: "If the number of livestock is greater than the natural capacity of the ranch, the latter becomes over-grazed. If they are carried through a winter, the ranch's reserve of hay may be used up. An overgrazed pasture does not get back its cover for a long time, as the root system of the grasses is weakened. Weeds grow apace and the top soil is swept away by run-off water. There is no reserve of forage, and if the spring comes on dry, no new grass will appear." The newcomer to ranching—and for that matter, many an old hand—needs to know early that exhausting the growing power of the grass through close grazing is something to be avoided like the plague.

Only a few inaccuracies, chief of which is the supposition that the public ranges have been largely restored to their former grass cover, can be detected in this eminently sound treatment of the subject of ranch economics. Most ranges still have a long way to go to reach the stage of full forage production. Closely allied to this is the questionable suggestion that a deficiency of summer grazing can be made up more easily than one of winter capacity. The intimation that there will often be areas of public domain that one can get on with grazing animals should be carefully looked into in the western range country where, generally speaking, the demand for summer range far exceeds the supply. The statement that the lucky permit holder on public grazing land has, in effect, a vested interest in the public domain is a moot question that might be challenged. These however, may be regarded merely as occasional aberrant strokes of the brush that has painted a true picture of ranching, its hard work and its compensations, as faithful in color and as sharply etched in design as the range country itself. The book, admittedly written for the newcomer to ranching, can be read with profit by all, old or new, who are still humble enough to recognize that they still do not know all about ranching.

E. A. Johnson.

PRICKLY PEAR STANDS GUARD

BY LOUIS E. REID

MANY West Texas stockmen find that prickly pear can be temporarily useful pending the full restoration of the range, it is reported by Ben Osborn, range conservationist for the Soil Conservation Service at San Angelo.

Ben, who works with ranchers cooperating with the Eldorado-Divide Soil Conservation District, says that the prickly pear often protects the only remaining stands of desirable grasses in overgrazed pastures.

When grazing pressure is lightened the desirable grasses which have been growing in the clumps of prickly pears furnish necessary seed for revegetation. With a good cover of quality grasses on the range, erosion from wind and water is controlled and productivity increased.

A frequent sight in the area Ben serves is sideoats grama and fall witchgrass seeding in a clump of prickly pear, while only red grama, hairy triodia and needlegrass—all inferior species—remain on the areas which livestock can graze.

The prickly pears can be removed to eliminate possible injury to livestock after the grass is restored under a proper stocking rate. However, Osborn points out, cattle and sheep aren't likely to become pear eaters on good range with plenty of palatable feed available. A few pear clumps scattered around also offer protection to game birds.

Our Honored Dead

DURING the war years the Soil Conservation Service kept a careful record of former employees who were in the armed services of the country. We were very, very proud of all of these men—and still are. Just outside of my office door we kept a chart, showing the number in service—and the number who made the supreme sacrifice.

Now that the war is ended, we believe it appropriate to record in our official magazine the names of the 86 former employees of the Soil Conservation Service who died in action. These brave men cannot return to us as most of their comrades have done.

★

Even before they took up arms in combat, these men were working in the service of their country. They were soldiers in the fight against erosion—an enemy capable of destroying a nation quite as effectively as the armed might of an enemy country. He who fights to protect the resources on which the life of his country is based is in all truth fighting for his country and his people.

Mere words are woefully inadequate to express our debt to the heroic men who cannot rejoin us. We reverently salute each and all of our honored dead, whose names are listed hereafter.

Hugh H. Bennett

Bennett, Percy B_____ Agricultural aid, Yorktown, Tex.
Bond, Alfred D_____ Junior engineering aid, Bernice, La.
Brown, Noel A_____ Junior range examiner, Big Spring, Tex.
Buoy, Chester L., Jr.___ Assistant soil technologist, Mount Carmel, Ill.
Burgess, Robert E_____ Student assistant, Safford, Ariz.
Butler, Horace F_____ Soil conservationist, Leesburg, Ga.
Carlson, Selway C_____ Assistant agricultural aid, Pocatello, Idaho.
Coleman, Gerald D_____ Assistant clerk, Decatur, Tex.
Craft, Dean H_____ Clerk, Albuquerque, N. Mex.
Crow, Perry E_____ Junior clerk-typist, Fort Worth, Tex.
Cubberly, George E_____ Soil conservationist, Prince George, Va.
Derflinger, James Ralfe_ Soil conservationist, Clarksville, Va.
Eberle, William Jr_____ Conservation aid, Imperial, Nebr.
Elliott, James F_____ Junior engineering aid, Tyler, Tex.
Engholm, John W. R___ Soil conservationist, Artesia, N. Mex.
Espinosa, Delfin G_____ Tractor operator, Clayton, N. Mex.
Ferril, Wilburn H_____ Engineering aid, Stillwater, Okla.
Forrest, Bedford H_____ Soil conservationist, Danburg, N. C.
Foster, Glenn E_____ Assistant clerk, Spartanburg, S. C.
Fraker, Richard A_____ Soil conservationist, Camden, S. C.
Fuelscher, O. Kenneth__ Clerk, Dalhart, Tex.
Gandy, John E., Jr_____ Assistant soil conservationist, Kingstree, S. C.
Gleason, Paul J_____ Agricultural engineer, Lamar, Colo.
Gustafson, Earl B_____ Cartographic engineer, Beltsville, Md.
Hardin, Lyles G_____ Conservation aid, Graham, Tex.
Harrison, Ashley_____ Machine operator, Mexican Springs, N. Mex.

Hawk, Ira A---------- Soil conservationist, Oakland, Md.
Hirt, Peter, Jr--------- Assistant clerk-stenographer, Warrenton, Oreg.
Hurd, Layton B-------- Administrative assistant, Portland, Oreg.
Irby, Francis M-------- Soil scientist, Spartanburg, S. C.
Keathley, George D---- Soil conservationist, Hereford, Tex.
Kellar, Richard C------ Soil scientist, Washington, Ind.
Kelly, Lloyd W--------- Agricultural engineer, Beeville, Tex.
Kneuer, Otto E--------- Assistant clerk, LeMesa, Calif.
Lane, Robert A--------- Junior soil conservationist, Frederick, Md.
Laubach, Jack R------- Soil scientist, Georgetown, Del.
Leonhardt, Henry Lewis- Assistant soil conservationist, Winner, S. Dak.
Lines, William F------- Soil conservationist, Cumberland, Md.
Lockridge, Alvin L----- Soil conservationist, Fabens, Tex.
Lloyd, William S------- Conservation aid, Sutton, W. Va.
Lunt, George A--------- Assistant clerk-stenographer, St. George, Utah.
McCorkle, J. Ray------ Assistant agricultural engineer, Montrose, Colo.
McKesson, Elmer L----- Junior soil conservationist, Edgefield, S. C.
Mickler, Marvin F------ Junior clerk-typist, Milwaukee, Wis.
Mobley, James D------- Assistant engineer aide, Albuquerque, N. Mex.
Moore, Alfred M-------- Assistant soil conservationist, Goochland, Va.
Neely, Thomas W------ Soil conservationist, Orangeburg, S. C.
Neumann, Wesley John-- Associate soil conservationist, Decatur, Tex.
New, Harold R--------- Student aide, Manhattan, Kans.
Nichols, Roy A--------- Junior agricultural engineer, Carthage, Tex.
Noblitt, William G------ Soil conservationist, Galax, Va.
O'Connor, Robert M----- Conservation aide, Bridgeport, Nebr.
Oppemheim, James R--- Agricultural engineer, Clarksville, Tex.
Park, Robert Smith----- Junior soil surveyor, Amarillo, Tex.
Parkins, Judson Harlow- Associate soil conservationist, Pendleton, Oreg.
Peterson, Earle B------- Soil conservationist, Troy, Ala.
Porter, Albert E-------- Agricultural engineer, Sentinel, Okla.
Price, Hershel D------- Soil conservationist, Sulphur Springs, Tex.
Price, Norman H------- Soil conservationist, Kentwood, La.
Richmond, Ganis J------ Agronomist, North Platte, Nebr.
Ripley, Raymond G------ Soil conservationist, Princess Anne, Md.
Rountree, James E------ Assistant soil conservationist, Waxahachie, Tex.
Rouze, Robert E------- Civil engineer, Cloverdale, Oreg.
Saucier, Henry Quitman- Junior soil scientist, Spartanburg, S. C.
Scott, Elbert D--------- Conservation aide, Alice, Tex.
Shelton, Frederick E---- Soil conservationist, Fayette, Miss.
Shirley, Basil---------- Engineering draftsman, Fort Worth, Tex.
Simons, John A--------- Administrative assistant, Albuquerque, N. Mex.
Skelton, Jerred Ottis---- Lithograph pressman, Beltsville, Md.
Smith, Franklin J------- Engineering aide, Snyder, Tex.
Smith, Gilmer P------- Assistant soil conservationist, Mendenhall, Miss.
Smith, Lionel F--------- Soil conservationist, Jasper, Ala.
Smith, Robert H-------- Agricultural aide, Lafayette, Ga.
Spofford, Gerald E------ Agricultural aide, Rising Star, Tex.
Stark, Nance D--------- Junior soil conservationist, Rock Hill, S. C.
Stuewer, Donald H------ Soil scientist, Logan, Iowa.
Thompson, Loren E------ Junior engineering aide, Burlington, Colo.
Tustison, Charles H---- Forester, Wautoma, Wis.
Verner, Lemuel H------ Junior laborer, Watkinsville, Ga.
Walker, Neal H--------- Soil scientist, Madawaska, Maine.
Wallace, Leon W--------- Soil conservationist, Russellville, Ky.
Wayland, Clifford H---- Junior administrative assistant, Washington, D. C.
Weaber, Ivan J---------- Soil conservationist, Hebron, Nebr.
Wilmeth, Lillard G------ Soil conservationist, Mt. Pleasant, Tex.
Woolbright, Charles H-- Junior storekeeper, Americus, Ga.
Wustrack, Robert R----- Clerk-typist, Lincoln, Nebr.

Placement of Ponds

In the recent Report of the Biology Division of the Soil Conservation Service to the House of Representatives Committee on Conservation of Wildlife Resources, Edward H. Graham, division chief, stated:

". . . the pond is not built on land better adapted to the production of tilled crops, livestock or wood products. It is situated where it conveniently serves to water livestock, cover a gully, provide a place to raise fish, or for some other specific use requiring the impoundment of water, and where any or all such purposes contribute to the ideal use of the land. As much care goes into the selection of the pond site as is given to the choice of a field for corn production or the decision that the best land use for a hillside is to devote it to woods. The assistance given to the farmer who wishes to raise fish for food in his pond is of the same quality as that offered when he desires to raise kudzu for livestock forage on an eroding bank."

REFERENCE LIST ☆☆

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SOIL CONSERVATION SERVICE

Federal-State Cooperative Snow Surveys and Irrigation Water Forecasts for Colorado River Drainage Basin, March 1, 1946. Division of Irrigation, Soil Conservation Service, United States Department of Agriculture, in cooperation with Colorado Agricultural Experiment Station. March 1946.

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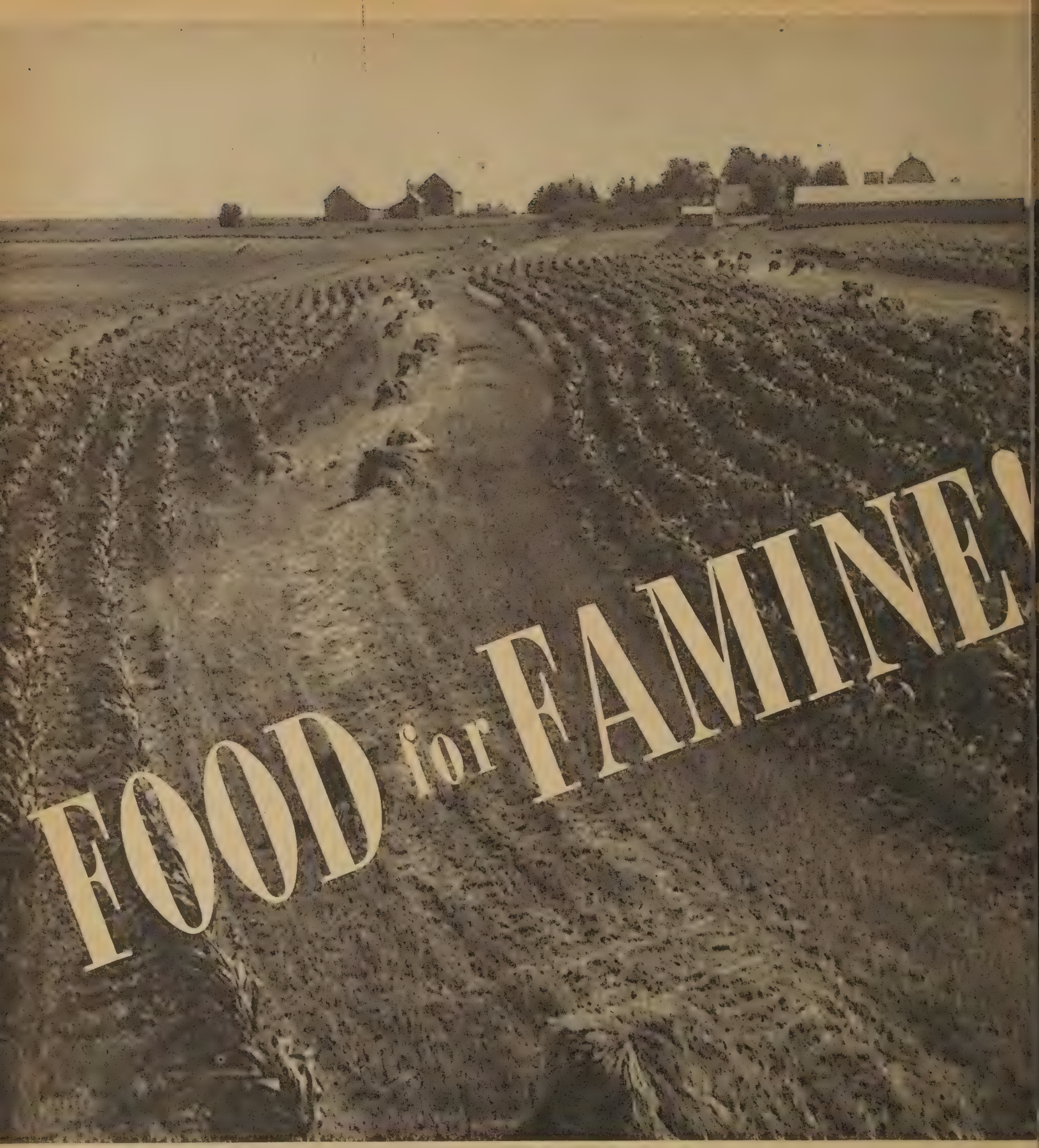

HARVESTS are greater under soil conservation methods. Grain yields respond upward to the urge of terracing, strip cropping, and other modern practices.

SEPTEMBER
1946

SOIL CONSERVATION

OFFICIAL ORGAN OF THE SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, WASHINGTON D. C.

SOIL CONSERVATION

CLINTON P. ANDERSON
SECRETARY OF AGRICULTURE

HUGH H. BENNETT
CHIEF, SOIL CONSERVATION SERVICE

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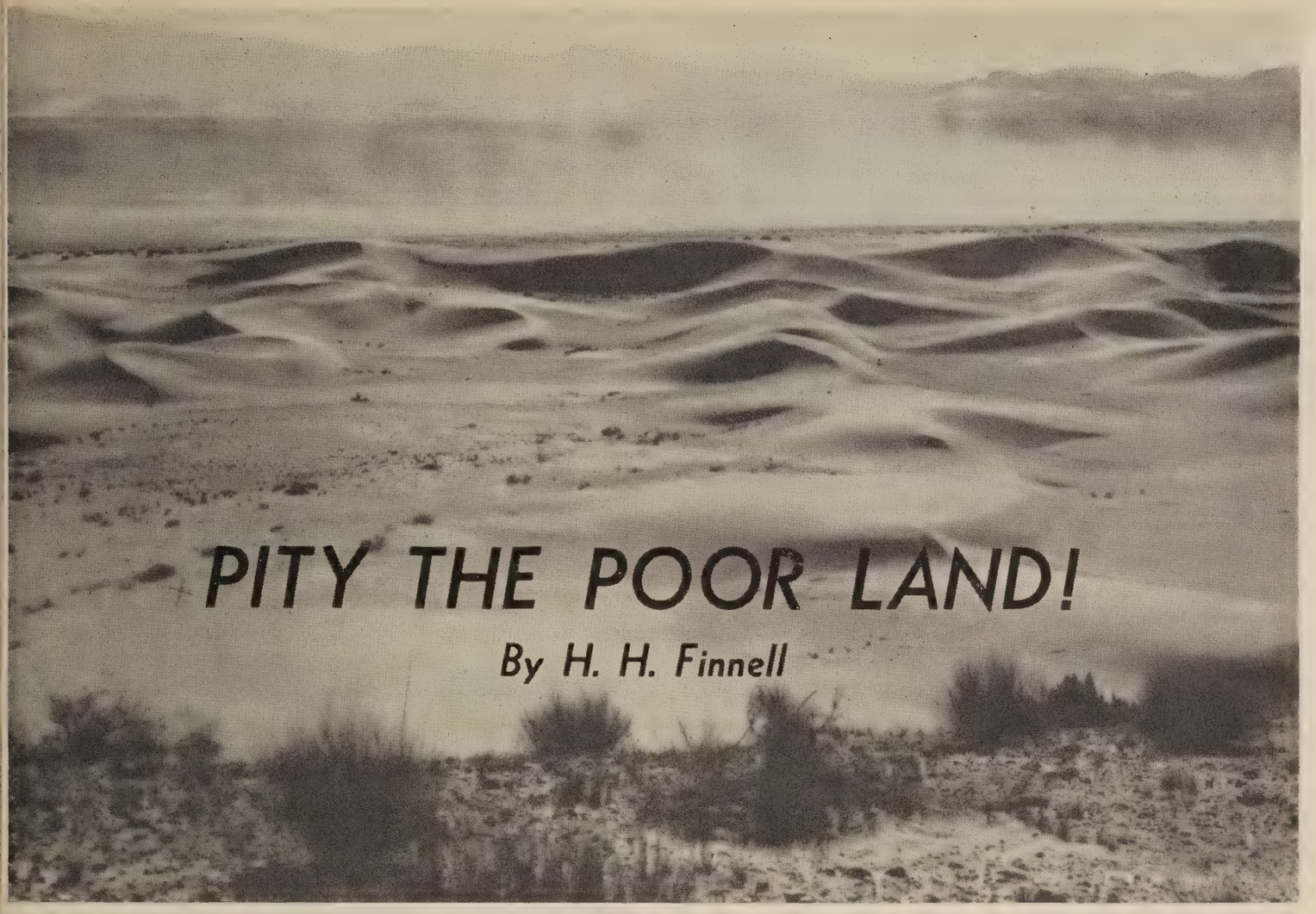
WELLINGTON BRINK, EDITOR

CONTENTS

Both Louis Berns, Jr., and his collie make efficient hands on the family farm near Garnaville, Iowa. Strip crops may be faintly discerned in background. (Photograph by W. H. Lathrop.)

SOIL CONSERVATION is issued monthly by Soil Conservation Service of the United States Department of Agriculture, Washington, D. C. The matter contained herein is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business, with the approval of the Director of the Budget. SOIL CONSERVATION seeks to supply to workers of the Department of Agriculture engaged in soil conservation activities, information of special help to them in the performance of their duties. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., 10 cents a copy, or by subscription at the rate of $1.00 per year, domestic; $1.50 per year foreign. Postage stamps will not be accepted in payment.



PITY THE POOR LAND!

By H. H. Finnell

Overgrazing and wind erosion piled these desert sands to the north of Rio Salade, 4 miles above its junction with the Rio Grande, in New Mexico. Prior to 1890 the scene was different.

A NEW DUST BOWL may be in the making. The pattern was set by the blinding black blizzards of the "dirty thirties"—blizzards which could have been prevented.

Out here in the Great Plains when the surface of cultivated soils becomes bare of crop stubbles, all you have to do to get a dust storm is to wait for the March winds. These winds are one of the most dependable features of the plains climate. They come every March, just as it says in the poem, except that some years "March" comes in February and again in April. Farmers put the land in condition to blow by making a failure of crops through misuse and abuse of the land. Nature can then be counted on to add her vengeful touch.

NOTE.—The author is project supervisor, Soil Conservation Service, Amarillo, Tex.

The old familiar routine is being faithfully carried out. During an hour's drive into the countryside near Cheyenne Wells, Colo., in mid-April, 1946, there were 29 powerful tractors to be seen ripping up the sod. They were plowing again the land reclaimed from the dust by Government help and sowed back to grass in the 1930's. They were also turning over native sod on shallow soils never before plowed. This was but a sample of the mischief going on in a dozen other localities along a 600-mile front.

For half a century this margin zone has been the scene of repeated cycles of frontier crashing, bankruptcy, and abandonment. Greenhorn settlers have pushed out into the arid plains beyond the established farming zone. They have messed up the place, gone broke, and vacated it to lie idle again until a new crop of suckers got ripe.

The last cycle began about 20 years ago. High prices for crops and land, the big adventure of pioneering—and before you know it you are away out there in the beginning of nowhere. To be caught in one of these booms means eventual failure, and another move, leaving despoiled land be-

Whirlwinds: Finely pulverized soil invites disaster. Stubble stands guard. Tillage with one-way plow helps pin down soil.

hind you. It never fails, when the conditions are right.

Now, the same process is starting again in the very same place. If the present situation is any different from that of the late 1920's, it is worse—in many localities, at any rate. Replowing previously damaged land seems foolhardy enough; but extending cotton and wheat farming further over the ragged edge than ever before leaves the old time plainsman dumbfounded. One item of comfort is that the plow-up in the Great Plains was not nearly so extensive during the recent war as during and following World War I. And much of the land that was plowed had not been plowed previously.

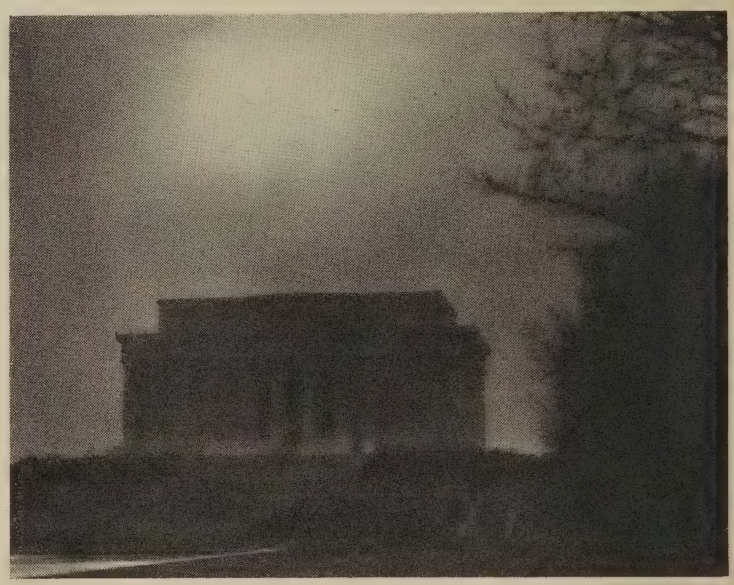
The worst abuse of the land has taken place in New Mexico, Colorado, and Texas. In New Mexico, loose sandy soils are being planted to pinto beans, as they are to cotton in the extreme western part of Texas. All of our experience shows that such lands can rarely be kept under control more than 2 or 3 years after being broken out of their protective cover.

In Colorado it is not so much a problem of sand as of thin soil. The plowing of shallow and droughty lands was being prevented by Colorado's original conservation law, through organized soil conservation districts controlled by farmers and ranchers. However, the enforcement of land-use regulations has been under attack for about five years.

Opponents of conservation first took a test case to the State Supreme Court. A land owner seeking a permit to plow inferior land appealed from the decision of the Smoky Hill Soil Conservation District. Having been soundly beaten in the high court, their attention was turned toward the State conservation law. Land speculators, who were swayed more by a chance to cheat a new generation of greenhorns than by public welfare, got in their innings—helped to pull the teeth of the law.

Now the control of the district regulations is no longer in the hands of the farmers and ranchers who live on the land. Restrictions against the cultivation of inferior land were quickly voted out by the absentee ballots of nonresident owners. It is not at all unlikely that Coloradoans will live to regret allowing themselves to be pushed around by out-of-state speculators.

Certain strongly financed land companies also were on the alert. When the double trouble of depression and dust storms threw hundreds of thousands of acres of marginal land on a buyers' market, they bought at rock-bottom prices. The Federal Government was also in this land market,



Science Service gives us this view of a dismal day in the Nation's Capital in 1935. The sun became a midnight moon as it sought to penetrate the darkness cast by drifting farms and ranches from western blow areas.

but Washington was only buying in the worst spots with the purpose of stabilizing shifty soils for public protection. Various land companies were getting ready for the suckers. Now they are profiting by the sale of low-grade land at prices worthy of the best plains wheat land.

Just to show how lucrative this land business is, a pressure group was organized last winter to lobby Federal law changes which would provide for the resale of reclaimed lands to private ownership. The tracts in question were purchased by the Government and painstakingly restored to grass by the Soil Conservation Service. The pressure group

included interested men from neighboring States. They organized themselves with the announced purpose of obtaining the removal of Federal protection from these lands.

With so many people putting so much determination into it, getting this margin land back into condition to blow again is a cinch. The next dust bowl can easily be a whiz-dinger!

Here it might be said that living next door to this sort of thing promises to get tiresome. Country people are not the only ones to suffer when the dust breaks loose. Automobile crashes multiply. Delicate machinery—machinery of all kinds—is damaged. Trade, transportation, and public services are interfered with. Housewives become most unhappy. All this in addition to the land damage!

Surveys by soil conservation technicians show that during the "dirty thirties" around 90 percent of the inferior grade land on the plains then in cultivation was put out of production by wind damages, permanently or for varying periods. Of the middle grade land, about 26 percent was so damaged it was not practical to continue cultivation. At the same time only 0.8 percent of the choice grade land within the dust bowl area was

SOIL BLOWING

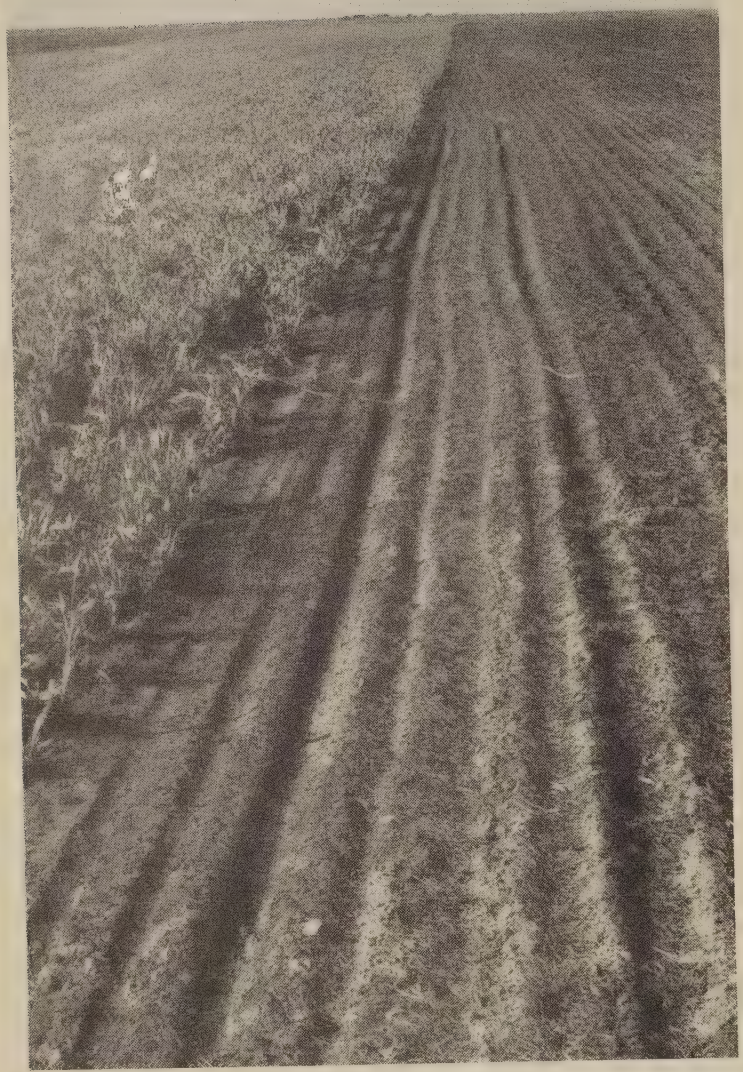
Conditions were reported favorable for soil blowing on a total of 7,284,192 acres. A year ago conditions were reported favorable for soil blowing on 3,783,978 acres. The report of November 1, 1945, showed that conditions were favorable for soil blowing on 4,495,050 acres. Texas accounts for more than one-third of the total acreage reported this year * * *.

The reports show that as of April 1, 7,986,694 acres were being contour-farmed. The acreage being contour-farmed in counties having a soil conservation district totals 6,646,834. In other words, a very high percent of the contour-farming is being conducted in counties having an organized soil conservation district * * *

Terraces are protecting 4,130,983 acres. Texas and Oklahoma lead the other States in the amount of terracing that has been done. They likewise lead the other States in the amount of contour-farming that is being practiced. Of the total acreage protected by terraces, 3,451,794 acres are in counties having a soil conservation district. Of the 384 counties reporting, 261 have an organized soil conservation district, as compared with 243 counties of the 413 reporting a year ago.

NOTE.—This statement is taken from the April 1, 1946, Report of Committee on Conditions in the Great Plains; R. I. Throckmorton, Chairman.

Colorado dust storm in May of '37. Total darkness lasted half an hour.



Kansas barrier: A field wind-stripped with alternate rows of sorghum 10 rods wide and summer fallow 20 rods wide. The fallow strips were planted to winter wheat in September.

seriously impaired. That experience should teach us a clear lesson in soil conservation.

The best basic precaution against dust storms is to keep cultivation away from sandy lands and shallow soils and to keep out of the excessively dry sections. The most trouble has consistently shown up along the belt of 14 to 17 inches annual rainfall. Pointing the finger of caution at these more critical parts of Kansas, Colorado, New Mexico, Oklahoma, and Texas by no means indicates that they are worthless. The cattlemen hated to see their ranches broken up for farming in the first place. They were excellent grazing lands. However, there was no practical way for the ranchers to resist the pressure of inflated land prices. The newcomers were not exactly jubilant, either, in the end. After foolishly investing their all in a risky type of farming in a hazardous area their fate was sealed. They were generally forced out by the failure of their farming methods and low prices. In spite of the fact that each new wave of settlers was equipped with better crop varieties and better farming machinery than the one before, their "get-rich-quick" frenzy always led to overstepping the natural bounds. The little speculator hasn't a chance.

Alternately settling and abandoning this territory is getting us nowhere. Going broke is bad for people. It is wasteful of human effort. However, people are mobile. They can, theoretically at least, always go somewhere else and start over. But the poor land can't. It's stuck! It has to make a new start right where it is after each abuse and abandonment.

The lucky strikes that have been made in wheat along this ragged edge of the farming belt have never compensated for the lost use of the land for grazing during the lengthy recovery periods.

"Why doesn't somebody do something to stop this senseless folly?" you may ask.

The answer is that as long as American style freedom prevails and such vacancies open up in a region about which there remains much wide-

Emergency cover. Cane and Sudan grass, listed on contour at suggestion of the Soil Conservation Service, brought the first control to area around these good farm buildings in South Dakota in 1937. Two years before, the soil had drifted up to 6 feet deep around these barns and the place had been abandoned.

Man leans against wind. But contour blank-listed furrows protect this field and collect soil blowing from unprotected neighboring field. Oklahoma fights, too!

spread ignorance people will jump at the chance to swallow the sucker's bait. To buy cheap and sell dear is an ancient and honorable occupation. The large land dealers who bought during the depression were not exactly speculating. The land was worth the low prices they paid. The real gamblers are the small ones now busy.

Restraint is not the best remedy. It proves too uncertain. If backed up by a strong and intelligent majority it could be made to work. But if land owners and operators were universally intelligent, informed, and understood both sides of the problem, there would be no need of restraint.

A more logical and permanent remedy would be the development of an intermediate type of agriculture to use marginal land. This land is just as capable of being efficiently operated as any other land, provided the demands made upon it are kept within its natural moisture and fertility capabilities. Ranching is not intensive enough to resist

temporary economic pressures; while grain farming is too intensive for the physical limitations of the land. A special type of agriculture for marginal land is needed. It must use the land more intensively than ranching and at the same time more safely than grain farming. Men of stable character and more patience than those who ride on waves of speculation will be needed to work this out.

It may be hoped that the several state agricultural colleges and the agencies of the United States Department of Agriculture will combine forces to promote effectively such an aim. In the meantime, the Southern Great Plains Agricultural Council meeting last January in Denver recognized the imminent danger of the present trend. Their resolutions to Clinton P. Anderson, Secretary of Agriculture, strongly recommended applying the brakes to the marginal land boom. The facts of land capability in this questionable area should be given freely to the public. Farm credit should be carefully administered so as to prevent contributing to unsound farming enterprises. The Government should retain ownership of restored lands that are subject to hazardous usage.

If these measures were vigorously applied the best we could hope for would be to soften a little the severity of the crash in which the present runaway situation is almost sure to end.

There are a few people in America who feel that the landed heritage of the Nation is too sacred a thing to play tricks with. But leaving out all sentiment, there is a cold business proposition to be considered. A rather important block of our national productive capacity lies jammed up against this trouble zone. The fact is that millions of acres of the best land are intermingled with hazardous areas. This proximity is a recurring threat to the important and far-flung dry farming industry.

Dry farming does successfully occupy the highly durable soils of the 17- to 25-inch rainfall belt. This semiarid plains region, in contrast to the adjacent arid ranges, is good farming country. This large area is pretty evenly balanced in moisture and soil fertility supplies. This natural balance is an essential factor in producing crops with the least possible drain on soils and invites the efficient use of labor. With barely enough rainfall to make the land produce creditably the problems of soil leaching and washing are comparatively light.

The Great Plains region is not fully appreciated. It is good country when properly handled for sustained grain and livestock production. It should be added that there is no valid physical excuse for dust storms.

We know enough from practical experience over three generations of coming and going in the plains to value accurately its assets and liabilities. We will have nobody to blame but ourselves if we keep on making a mess out of it.

Wind erosion control is no longer an unsolved problem. For those who know how, it is easier than keeping the soil from washing away. Experienced plainsmen are not likely to run dangerous risks, but Heaven protect us from another invasion of greenhorns!

HEADLINES IN SCHOOL ANNUAL

Conservation farming is making the headlines again. This time it is in the Arrow, 76-page school annual just published by the schools of Osage City, Kans.

The Arrow is really a community yearbook, and covering activities of the pupils in grades 1 to 12 inclusive. Contents include public interest stories on the leading community organizations. In this group is a double-page spread on the Osage County Soil Conservation District, with special attention to the Soil Conservation Service. This year is the first time the District has been mentioned in the publication. The inclusion indicated that the school kids are awake to the importance of soil and water conservation.

One page features the Board of Supervisors. The other page banners farming pictures showing the major conservation practices. It shows a terraced field with bromegrass outlets. The legend explains that the grass furnished hay and pasture, and helps control erosion. Another picture shows terraces holding water after a rain and the legend relates how the water was surplus and how the terraces permitted the water to leave the field without damage to the topsoil. Still another picture shows a stockwater pond with the pasture in the background. Its legend comments on the value of the pond and how it helps control grazing.

The attention which the yearbook accords the district represents careful work on the part of the high-school students.

Trashy cover helps prevent wind erosion. This Montana stubble is being given a going-over by a one-way plow, a method of tillage which helps to keep the soil in place.

This University Works for the Land

• By Wellington Brink Editor, *Soil Conservation*

CHIEF HARVEST of the land is Man himself.

From the soil comes the quality of his bone and muscle. What he is, what he does, how he does it, are determined by the acres that he tills. His courage, his ambitions, his very way of thinking, grow out of the furrows at his feet as truly as the wheat and cotton and clover he tends.

This oneness of Man with Soil is the important truth which activates the 2-day Annual Conference on Conservation, Nutrition, and Human Health. To this conference, called by Friends of the Land, come each June many of the country's topflight authorities in medicine, dentistry, plant and animal ecology, soil and water conservation, rural economics, philosophy, education. Together, these specialists fit the findings of science, as they seek to build the pattern of Man's relationship to his environment.

Again this year, June 29–30, the meeting was in Athens, Ohio, on the campus of Ohio University. To Ohio University, the first institution of higher learning to be established in the Northwest Territory, came nearly 200 men and women, each with pertinent information to contribute, each with an acquisitive mind. Teachers and scientists and professional leaders came not only from Ohio, but also from New England, from the South, from Minnesota and Missouri. Under the shade of the McGuffey elms, planted by Rev. Dr. William H. McGuffey, an early president of the University and the author of the famed McGuffey Readers, the conferees chatted of such matters as soil losses and lowering water tables, population pressures, productive capacity of land, organic matter in soil, nutrition's effect on teeth, the growth of children and the longevity of their elders.

As I strolled the green campus I came upon a great-limbed elm, mighty with memories. The trunk measured a good 7 feet straight through; the overhead spread of leaf, a full 120 feet. Noble survivor of the forest primeval, the burled patriarch stood as an eloquent reminder of the land that was, and exhorted all passersby to protect and make the most of the land that is. The rugged old elm—certainly one of the greatest yet remaining—once watched Mad Anthony Wayne push back the Red Man. It saw General Rufus Putnam and his surveying crew row down the Ohio and up the Hocking on business for his Ohio Company of Associates, soon after the Revolutionary War. It was getting to be an old-timer at the chartering of the University in 1804, when Greek, Latin, mathematics and the natural sciences just about encompassed the field of higher learning. It lifted its head proudly as the first two sons of the University were graduated in 1815; it saw one of those sons, Thomas Ewing go on to the United States Senate, later enter the cabinets of Harrison and Taylor and, still later, sit as close adviser to Abraham Lincoln. The old elm has been a spectator at the whole parade, has seen the wilderness cleared, the vigorous people build its homes and industries and culture, and has known the Republic's laughter and her tears.

Of cause for tears, there has been much: the brutality of ill-used axe and plough, the removal of the vegetative mantle, the pilfering of organic and mineral materials from the soil. Today, however, the vast, wise elm smiles more happily, for Ohio University is planting, with true McGuffey fervor, the seeds of a brighter tomorrow.

With every day the University consolidates its position as a pioneer in conservation education. Outdoors and indoors, it teaches the conservation of natural resources. Next year on the very slope that lies beneath the giant elm there will be a miniature conservation farm, with terraces and grassed waterways, strip crops, contour cultivation, wildlife spots and perhaps a pond, all done to scale.

Last year the University was host to still an-

other conference—the important Conference on Conservation Education. School administrators and teachers spend 3 days examining the available knowledge on the husbanding of soil, water, minerals, forests and wildlife, and discussing their responsibility for doing something constructive about conservation education.

And now, for the second straight year, the University has been the home of the Conference on Conservation, Nutrition and Human Health. Opening feature of this conference was a visit to the projected Athens Forest Park, just 8 minutes east by automobile from the campus. The park is an ambitious 5,000-acre undertaking in the heart of one of Ohio's problem areas. It's yet in the appraisal and planning stage. The State has appropriated $200,000 for purchase of land and for development. The building of a dam is contemplated—a dam which will impound a 190-acre lake, the waters from a 7.3-mile drainage area. One section of the park will be for public use—swimming, fishing, boating, picnicking. The remainder will be primarily for the use of University students, who thus will have ideal conditions for field work in conservation, geology, botany, biology, and plant and animal ecology.

Speakers at the conference sessions included Dr. John C. Baker, President of Ohio University, who welcomed the visitors; Rev. Father Leo R. Ward, Professor of Philosophy, Notre Dame University, author of "Ourselves Incorporated," who discussed the cooperative movement; Dr. Frank A. Gilbert, of the staff of the Battelle Memorial Institute, who reviewed the literature dealing with the relationship of soil to plant and animal growth and health; Dr. Emil Truog, Professor of Agronomy, University of Wisconsin, who talked of the problem of organic matter in the soil.

Dr. Ouida Abbott, Agricultural Experiment Station, University of Florida, examined the results of a deficiency of iron, copper, and cobalt. Dr. Fred D. Miller, Altoona, Pa., looked into the role of nutrition in the production of a sound dentition. And Guy Irving Burch, Director of the Population Reference Bureau, presented the problem posed by increasing world population and decreasing world resources.

Dr. Edward Graham, Chief Biologist of the Soil Conservation Service, talked about the capacity to use our land. Dr. James Asa Shield, Medical College of Virginia, addressed the conference on the "Psychological Behavior of People in Relation to Soil Fertility." Dr. Alice Chenoweth, Kentucky State Department of Health, took as her subject "The Nutritional and Chemical Growth in Childhood." Dr. John Sexton, Jr., St. Louis, had as his topic, "Nutrition, Growth, and Their Influence on Longevity."

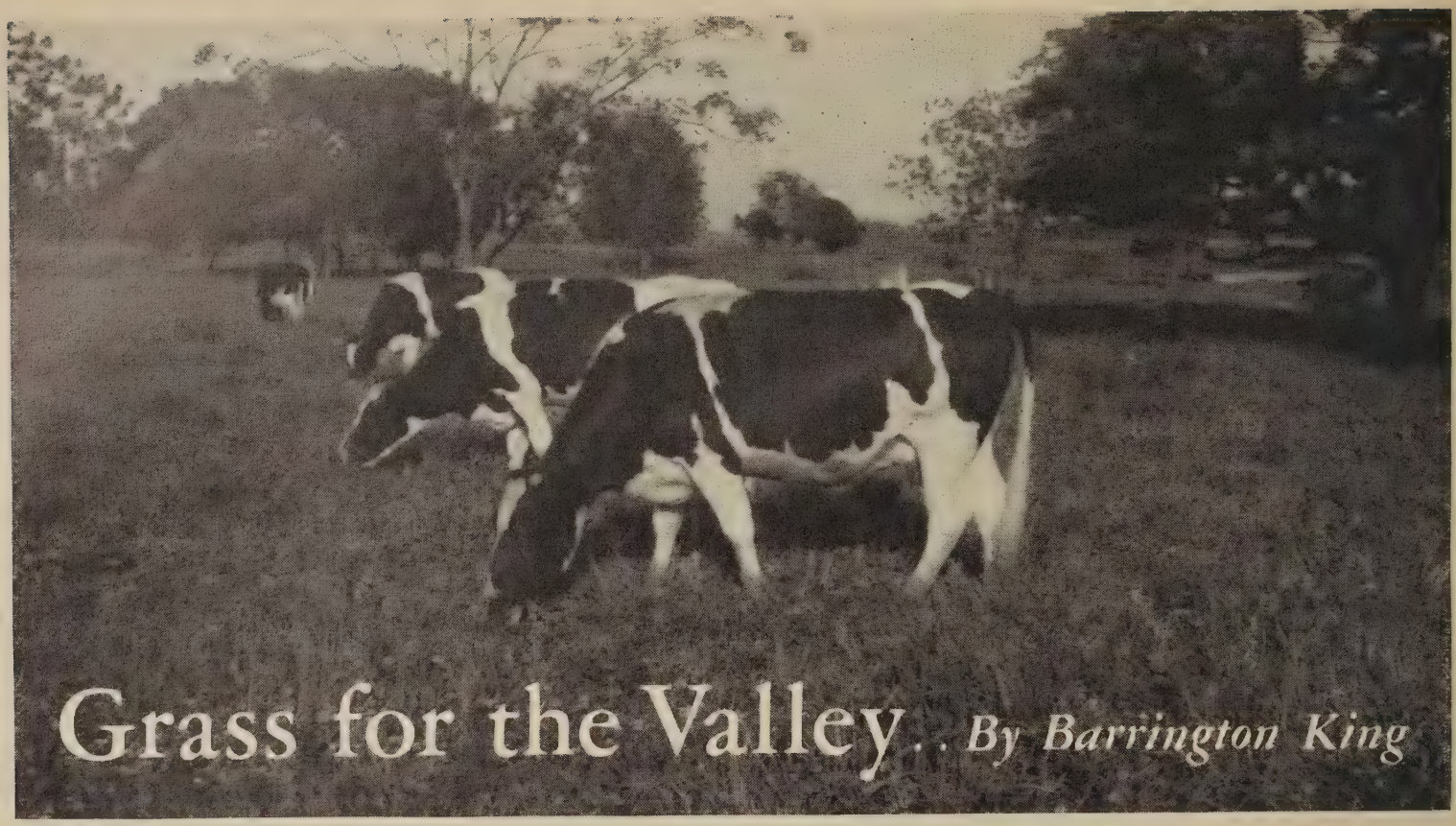
"The Church in Rural Reconstruction" was the subject of a paper by the Rev. Mr. Eugene Smathers, Black Lick, Tenn., who is secretary of the companion society, Friends of the Soil. "Utilization of Our Rivers" was discussed by Lachlan Macleay, President of the Mississippi Valley Association.

One of the most valuable contributions was the personal interpretation of the conference with which Dr. Jonathan Forman, Editor of the Ohio Medical Journal and Vice-President of Friends of the Land, concluded the sessions.

As opportunity affords, *Soil Conservation* proposes to salvage for its readers some of the more important materials of the conference.

In the meanwhile, it is pleasant to reflect that the patience of the fine old campus elm is being rewarded. After two, or perhaps three, conturies of bewilderment at the strange and costly vagaries of the human race, the great burled monarch of a once fair land now can take comfort in the upsurge of conservation education, conservation leadership, and conservation understanding.

Friends of the Land is a non-profit, non-partisan society for the conservation of soil, rain and man. If interested, write to Ollie E. Fink, the Executive Secretary, 35 East Gay St., Columbus 15, Ohio.



Grass for the Valley

By Barrington King

THE THREE Comer brothers, Alabama textile mills executives, are ardent backers of soil conservation because they have seen it pay on their own land. They propose to "roll out a green welcome mat to Alabama and the lower South."

The green welcome mat which the Comers urge would be of grass and clover, grazed by fat dairy and beef cattle. And it would extend for 100 miles—from Chattanooga to Gadsden—through the valley between Lookout and Sand Mountains.

Sons of the late Gov. B. B. Comer of Alabama, the brothers are following in his footsteps in agriculture and industry. Donald of Birmingham, is chairman of the board of a chain of textile mills in Alabama; Hugh, of Sylacauga, is president and treasurer, and Bragg, of Alexander City, is chairman of the finance committee.

To understand the brothers' interest in agriculture, you've got to know how they see the relationship between agriculture and industry. Hugh talks in simple, down-to-earth terms of cotton, clover, cows, customers and conservation.

Cotton is needed to make the denims, tickings, and chambray which are the products of the plants at Sylacauga, Alexander City, Birmingham, Stevenson, and Sycamore. But the Comers figure that a cotton hoe hand, eking out a bare living from eroded soil, doesn't make enough money to buy these products. So that's where the cows come in.

Holsteins graze the lush growth of one of the rotation pastures on Avondale Farm.

The Sylacauga plant has had a dairy herd for 40 years. About 11 years ago, Hugh Comer got the idea of improving the herd of grade cows. He bought a registered Guernsey bull, a bull calf, 3 Guernsey cows, and 2 heifers. But buying 6 to 10 carloads of alfalfa hay a year to feed the herd was still an expensive proposition.

So clover and conservation entered the picture, along with such other grazing crops as small grain, annual and sericea lespedeza, Dallis grass, Sudan grass, Johnson grass, Italian ryegrass, and bluegrass, to round out a complete year-round grazing program.

Row crops have disappeared entirely from Avondale Farm. Four 200-ton silos that used to be filled to overflowing with corn silage won't be used at all this year.

When the farm held a field day early this year, 400 farmers from the surrounding neighborhood—and some visitors from as far away as Boston—came to see cows grazing on Avondale pastures in January. Just to make the pastures show up to best advantage for the event, the cows had been taken off grazing during December.

NOTE.—The author is chief, regional information division, Soil Conservation Service, Spartanburg, S. C.

The pastures looked fine. But although the ration of concentrates was doubled for the milk cows during that period and the herd was fed silage, along with Johnson grass and lespedeza hay, the milk production dropped from 1,400 pounds a day in November to 950 pounds a day in December for the 51 cows then being milked. It was 2 weeks after the cattle went back to grazing in January before milk production again reached 1,400 pounds a day.

That experience gave Comer even more confidence in the possibilities of a year-round grazing program. He doesn't see why farmers throughout that section of Alabama can't have the same kind of grazing program as Avondale Farm. He figures they would make a lot more money from cows than they do from cotton—and so he gets around to the customers again.

If you think it's strange to hear a cotton manufacturer urging local farmers to raise cows instead of cotton, he'll hasten to assure you that he's not worried about the cotton supply. It will be produced somewhere. It'll be mechanized production, with flame weeders and mechanical pickers doing the work of human hands. But that's all the more reason to think about the customers, he believes.

With a small herd to begin with, it doesn't cost a great deal to go into a grazing program. Indeed, it actually saves money, he contends. He cites the experience of Avondale Farm to prove this.

Here are the simple facts:

"In 1938 we milked 35 cows. Now we are milking 55. At that time we were filling four 200-ton silos with corn ensilage. Last year we had one silo only partly filled, and this year they'll all be empty. We used to buy 6 to 10 cars of alfalfa hay each year. Now we buy no hay of any kind.

"But here's the pay-off. In 1935 the production was 600 to 800 pounds of milk a day. Now it's 1,500 pounds a day. That's a big increase, even when you consider we've improved our herd. We're making a nice annual profit per cow. Not one penny of new capital has been invested."

One thing that Comer insists on, is that nothing be done on Avondale Farm that the average farmer couldn't do. The textile mills could furnish the money for a lot of fancy buildings around the place or for a new registered bull now and

Guernsey cows resting in 10-acre permanent pasture of white Dutch clover and Italian ryegrass.

Crimson clover in one of the Avondale Farm pastures interests Donald and Hugh Comer.

then. But Comer doesn't want any fancy buildings and the money for new bulls has got to come from the sale of culls and calves.

In developing the present program, Avondale Farm has had the assistance of virtually every agricultural agency in Alabama—assistance that is available to any farmer in the State.

In April 1941 technicians of the Soil Conservation Service assigned to the Coosa River Soil Conservation District helped develop a complete conservation plan for the farm, with emphasis on grazing crops. Some labor assistance was furnished by the old CCC camp at Talladega which at that time was assisting in the district program.

Every opportunity has been used to earn AAA payments, which have been taken up in basic slag, superphosphate, and seed for pastures. Advice and assistance have been furnished by the United States and State Forest Services on fire protection, and by the Agricultural Extension Service and Experiment Station on developing the grazing program. In 1944 Sidney Davenport, manager of the dairy unit, visited the station at Bell Mina with the county agent and a group of farmers to observe work with crimson clover and pastures.

Everywhere—in the mill village, as well as on the farm—you see evidence that the Comer brothers are living up to the definition of the function of industry which was given several years ago by Donald Comer.

At a conference on human relations in industry the question had been asked, "What is the aim of industry?" Donald Comer gave the following reply:

"The function of industry is to take certain things that grow on the surface of the earth, or are buried beneath the surface, and convert them into sizes, shapes, and colors that the public wants; and to do this at the lowest possible cost, without any exploitation along the route."

Donald Comer, "the big boss," takes a lot of interest in the farm at Sylacauga and generally goes out with his brother, Hugh, for a look around when he comes over to the Sylacauga plant. J. E. Warren, vice president of the Sylacauga plant, and Sidney Davenport usually go along.

Out in the green fields, cotton fabrics are forgotten.

In the old bottomland pasture across the creek, the bluegrass seeded last year is coming along fine and is putting out a lot of seed heads, someone observes. Dallis grass, white clover, crimson clover, hop clover, and common lespedeza are found on this 127-acre pasture that used to furnish the only grazing on the farm.

The 358 acres of grazing crops now include, in addition to the original pasture:

31 acres of hillside pasture planted to sericea in 1946 with white and crimson clover and Dallis grass in the low places. Korean lespedeza and ryegrass were seeded in 1944. This area furnishes winter and spring grazing.

24 acres of crimson clover and barley which was planted in August last year and fertilized with 150 pounds of 4–10–7 per acre. It was grazed during November and from March 10 to May 1 this year.

20 acres of crimson clover, ryegrass, and Johnson grass, grazed from early January to March 10. The clover and ryegrass reseed each year and the Johnson grass is cut and stacked in the field for hay. It was fertilized with 300 pounds of superphosphate per acre this year.

25 acres of vetch and oats and Johnson grass, grazed from early January to March 10. Sudan grass is planted when the oats are harvested and is cut with the Johnson grass and stacked in the field for hay. The land is harrowed in the fall and planted to oats and vetch. It was fertilized with 125 pounds of ammonium nitrate per acre this year.

15 acres of oats and lespedeza, for grazing as needed. Oats are reseeded in the fall and lespedeza in the spring.

11 acres of barley, crimson clover, and Johnson grass, with Sudan grass planted for emergency grazing.

10 acres of white clover and ryegrass, grazed throughout the year, except for rest periods during dry weather and when the clover is seeding. Reseeded to rye grass every fall.

40 acres of Korean lespedeza which is cut for hay in July and then allowed to reseed. It was fertilized with 200 pounds of superphosphate per acre in 1944.

On 55 acres formerly planted to corn for silage, grazing crops will be sown this fall.

The 358 acres of rotation pastures furnish ample grazing for the herd of 120 head, even during periods when the pastures are lowest in production. During most of the year the ground is covered with a rank growth of grasses, clovers, and other legumes that rarely show the effects of graz-

ing at all. Erosion is almost completely controlled by the dense growth of pasture plant.

The mixed herd of 120 head includes 15 purebred Guernseys and 15 purebred Holsteins. The remainder is composed of half-breeds and grades. With milk production of approximately 1,500 pounds of milk per day from the 51 cows they were milking this spring, the milk cows are fed about 500 pounds of concentrates, or approximately 1 pound of concentrates to 3 pounds of milk produced.

The oats in the concentrates are produced on the farm, but the corn and cottonseed meal are bought. Comer says they can buy the corn as cheaply as they can grow it, and he would much rather have the land in pasture than in row crops. The silos—once the trademark of the more progressive farmers in the South—now stand empty, as signposts along the highway of a new agricultural development.

A similar program to that in operation on the dairy farm at the Sylacauga plant has been started at the mill at Sycamore. There 300 acres in grazing crops are furnishing feed for 108 head of beef cattle. Quality of the herd is being improved by breeding grade cows to good bulls.

Hugh Comer believes that a sound grazing program not only can revolutionize the agriculture in that section of Alabama, but also that it will provide the purchasing power that will attract new industries that will bring more payrolls and result in a better balance between agriculture and industry.

But grazing crops can do more than that. They can cover the eroded land that now stands out in great blots across the landscape in that section and turn it into a carpet of green—for 12 months in the year. Visitors from the north and east passing through that section to spend the winter in Florida would certainly get a vastly different impression of the potential industrial opportunities from a scene like that, he contends.

With soil conservation districts covering the entire State of Alabama, farmers in every county in the State have facilities for developing a sound grazing program. But Hugh Comer has in mind especially the narrow valley that extends from Chattanooga to Gadsden, a distance of 100 miles, flanked for the entire distance by Lookout Mountain on one side and Sand Mountain on the other. This narrow valley, averaging about 2 miles in

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MAN'S MARK ON THE LAND

By George R. Free

MAN LEAVES his mark on the land. The difficulty of concealing troop and equipment movements, gun locations, and the like, from aerial observation will not be fully appreciated until one has seen how practically every mark that man or nature puts on the land is apparent from the air. You can readily see the wheel tracks where a farm tractor made a turn, and, you can easily see also the pattern of thin soil and vegetation caused by past erosion, as well as the rills and gullies from more recent damage.

When one sees from the air a pattern consisting largely of straight lines, he can say with a considerable degree of certainty that man has made his mark on the land. Flowing water attempts to follow these straight lines and thus makes the mark of man more permanent. When we sign our names on paper, few of us use the "mark" made with two straight lines. Instead we write our signatures with lots of curves. We need more "writing" on the land and fewer "marks." From now on when I hear the cawing of the flying crow, I'll know that I am listening to his Bronx cheer directed at our illiteracy.

EXPERTS IN MEMBERSHIP

Two directors of the newly formed Steuben County Soil Conservation District, in New York, will certainly know all the answers. They are Francis Potter, Hammondsport, and Ralph French, Avoca—both former Soil Conservation Service technicians.

Potter, who now operates his own farm, was formerly district conservationist with the Schuyler County Soil Conservation District. Besides operating his farm enterprise, he is also farm manager for the Pleasant Valley Wine Company.

French, former district conservationist in Ontario County, now runs a dairy and general farm.

The Steuben County District received its certificate last spring and became the twenty-ninth district in the State. It is in a general farming, dairying, potato, and vineyard area. District headquarters will be at Bath. Cortland County district became New York's thirtieth 2 weeks later.

Teamwork Solves a Problem

By Clay E. Wilson and J. A. Smith

TO THE SOIL CONSERVATION district supervisors of Oklahoma's central Washita River valley the problem was plain. Equally plain was the solution. The trouble was: Where were they going to get the tools?

The problem was to tie down the soil on the Washita Valley's badly eroded slopes and make it productive again. It had been one of the richest soils in the world at one time, this Oklahoma earth—a red sandy loam, mellow and deep. People like Will Tims, chairman of the Grady County board of district supervisors, could remember. He was 8 years old when he first saw this country—peering out from under the hood of a covered wagon, 60 years ago. The wagon plowed through a sea of grass, lush and thick, reaching to the horses' bellies in places. Wild game was everywhere. The streams ran clear. Then they sent their ploughs through the virgin soil, and the bottom lands turned out magnificent crops of corn and cotton. So did the hillsides—for a while at least.

And then, of course, it began—the same old erosion pattern that had begun on the Eastern seaboard and followed the settler west. The corn and cotton couldn't hold the soil on these slopes any more than they could on the Piedmont hills, hundreds of miles to the east. The hillsides washed and gullied; wind carried off the fertile topsoil in clouds; yields dwindled; sterile subsoil washed down and damaged bottomlands.

The floods began to come, each year more destructive than the last. One year in the early thirties 17 people were drowned.

The farmers rallied to fight back through their soil conservation districts. Soil and water conservation measures were pushed forward on all sides. But most everyone suspected that the most important thing to do was to put the slopes back into grass on a vast scale—to make them as they were in the beginning, when the little creeks ran clear. In 1944 an intensive study of sound land use confirmed what people had been thinking, and it was decided that from here on out the soil conservation program would emphasize reestablishing native grasses on badly eroded steep slopes that had been in cultivation, and on odd or inaccessible acreages. And this should be done immediately, if much of the land was not to be sacrificed.

The trouble was: The proper tools for doing a job of this size had not yet been invented, and the methods currently available were not efficient. The fact that there were so few grassed acres in the whole area proved that. These had been sodded with bermuda roots, or seeded with native grasses by broadcasting or planting in rows with a cotton planter. But these measures couldn't possibly be used to revegetate half a million acres. It would cost too much—in money and time. What was needed was a machine drill. And there was no drill on the market which could handle the tiny or chaffy grass seed.

It wasn't only the Washita Valley, of course, that needed such a drill. Requests for a grass seed drill had poured in to the Soil Conservation Service from all parts of the country—which was why SCS set out to develop one at its nursery in Woodward, Okla. By the spring of 1944 a successful drill had been built, and blueprints made available to the public.

It was this first drill that the Grady County Soil Conservation District used in that same spring of 1944 to plant a small amount of seed. The drill worked perfectly. The next year two small models of the new drill were borrowed from SCS by six conservation districts—Canadian-Walnut, Grady County, Stephens County, Jefferson County, and North Caddo County, and South Caddo County. An idea of the value of the new drills can be quickly obtained by considering the fact that in that one season 5,161 acres were put into grass as compared with 11,000 acres for all previous years.

But two borrowed drills weren't enough. To push the work forward at the required speed the districts figured they needed at least seven. The Chickasha Chamber of Commerce had authorized the building of one drill, the Grady and the Stephens County Soil Conservation Districts two each, and the South Caddo County and the Canadian-Walnut Districts one each.

NOTE.—The authors are district conservationist, Soil Conservation Service, Chickasha, Okla., and information writer, Soil Conservation Service, Washington, D. C., respectively.

The materials for these drills, where were they to come from in this time of war scarcity? And the parts? And who was to build them with machine shops overworked and undermanned?

The supervisors didn't know. All they knew was that somehow the drills *were* going to be built. First, they scouted around for parts. Secondhand grain drill frames were salvaged, automobile transmissions picked up here and there. Cotton planter boxes, discs and press wheels were ordered. Assured of the parts, an iron works in Chickasha finally agreed to build the drills. Averaging about $300 each, cost of the drills was shared by the several districts. A small per-acre fee will liquidate the original cost and provide funds to build more drills.

Everybody felt plenty good as the last drill rolled out of the factory early in February of this year. The Chickasha Chamber of Commerce gave a victory luncheon for the supervisors. Then they loaded the drills on trucks and sent them off to begin their work on the worn-out fields.

But the supervisors' troubles still weren't finished. There wasn't enough of some of the better grass seed because of last year's unfavorable harvesting weather. The supervisors solved this by appealing to the local farmers, and the shortage has by now been largely overcome. Local farmers have found that with certain adjustments and adaptations combines can harvest grass and legume seed—which bring good prices.

The districts are also furthering the program by buying rotary fresnos for farm tractors in lots of 5 to 10 for resale to district cooperators. Phosphate in carload lots is being brought in for the depleted soil, along with nitrogen for speeding grass growth in certain areas and for fertilizing fish ponds.

District supervisors don't get paid for their work. But they do get something in return. Bill Walker tells about it. From his front yard he can see two watersheds. One is not part of a conservation program. It floods with every major rain. The other used to flood regularly once or twice a year until it was taken into a coordinated soil conservation program. To date it has had but one flood in 6 years.

"Things like that make you feel maybe you're doing something worth while," Bill Walker says.

Cattle of medium quality on heavily grazed range near Walsenburg, Colo.

IMPROVED *RANGE* — MORE *BEEF*

By Kenneth W. Shanks

"THOSE yearlings look like they've been in a feed lot."

Actually, the yearlings in question hadn't seen a feed lot when this remark was made last fall. But because of a deal which their owner made with his neighbor, they had spent 6 months on a range quite different from the one to which they were accustomed. The result brought a big surprise to their owner, and it proved several points for the Upper Huerfano Soil Conservation District, out in Colorado.

Last June, Jake Hribar and Ernest Wadhams, Walsenburg ranchers, agreed to work with the district in a cattle-weight comparison test. Hribar weighed one bunch of his yearlings, placed half of them on Wadhams' ranch and turned the other

NOTE.—The author is district conservationist, Soil Conservation Service, Walsenburg, Colo.

View of Hribar pasture, across the road from that of Wadhams. This pasture is in "fair" condition and contains almost the same species as the "good" pasture, but in different proportions.

half back on his own range. At the same time, Wadhams weighed a sample of his own yearlings and kept them on their home range.

Last October at completion of the test the cattle were weighed again. Hribar's yearlings on his home range made an average daily gain of a pound and a quarter. Those which he placed on Wadham's ranch gained an average of 2 pounds a day.

The two ranchers shipped at approximately the same time. Wadham's received an average of $100.69 for his steers, while Hribar received only $74.47 on the average for his top animals.

The difference in performance corresponds to the difference in range. The ranches are across the road from each other, and the soil and climate factors involved are identical. The Hribar range was in what specialists call "fair" condition, with only 20 percent of the ground covered by desirable grasses, while the Wadhams ranch was in "good" condition, with 40 percent of the ground covered by desirable grasses. Wadhams' forage yield was nearly twice that of Hribar's. Whether range condition is "good" or "fair" depends on its management.

Ten years ago Wadhams started a program of moderate grazing. He added other parcels of land to his original ranch, and found the new areas heavily infested with three-awn, snakeweed, and other undesirable plants. After grazing these fields lightly, he discovered that 80 percent of the snakeweed could be choked out in 3 years. The good grasses, blue grama, and western wheat grass, thrived and increased in foliage and density. Since Wadhams acquired this additional range, the amount of good grasses in the forage stand has changed from 40 to 80 percent. The unpalatable plants decreased from 55 to 20 percent.

An inspection of forage was made at the end of the weight tests last fall. It was found that the "fair" range had been grazed about 20 percent more than is correct for the good grasses, while the "good" range had been grazed about 75 percent of its capacity. This use explains the difference in weight-gain made by yearlings produced on the "fair" and "good" ranges. It also tells why Hribars' animals grazed on the "good" range weighed 40 pounds more than the ones left on the "fair" range.

Still another story was brought out in this weight test. Ten years ago, in 1935, Wadhams decided to use bulls from registered stock instead of those out of his herd. As a result, his breeding

herd has good markings and better conformation, and puts on better gains. His yearlings averaged 590 pounds on June 15, as compared with about 532 pounds for the yearlings from average sires. Wadhams' better-bred animals weighed out at an average of 775 pounds as compared with 740 pounds for the others.

Thus, the test made by the district and the two ranchers compared three different things. It compared the gain of yearlings grazing on heavily grazed range in "fair" condition against the weight gain of yearlings placed on moderately grazed range in "good" condition. Next, it showed the gain made by yearlings moved from a "fair" to a "good" range, and finally, it compared Hereford yearlings bred from home-raised bulls with yearlings from registered bulls.

Comparisons of weight gains, together with annual grazing inspections of the forage, are being used by the Upper Huerfano district in an effort to help Huerfano County ranchers improve the condition of the range land, and ultimately the value of their herds and the income from their operations.

View of Ernest Wadhams pasture, showing range in "good" condition. Blue, grama, western wheatgrass, snakeweed, and cactus plants are prominent.

"THAT'S THE WAY TO RUN A DISTRICT!"

By Frank H. Mendell

A PERFECT attendance at all district commissioners meetings for 2 years is the record of the West Pottawattamie County District, out in Iowa. Public notice was given of the first meeting in April 1944. Farmers in the district were invited to attend and discuss district problems and their solutions.

Later, the commissioners decided that, except in the winter months when bad roads made night travel difficult, the meetings should be held the last Friday of the month at the homes of commission members. The wives and children have been almost as regular in their attendance as the commissioners themselves.

The regular meetings have also been regularly attended by District Conservationists Walter Weiss, Arthur Thoreson, Farm Planners R. G. Bullard and C. W. Renaud, County Extension Director Cliff Johnson, and Earl New, farm editor of the Council Bluffs Nonpareil.

"At our first meetings we agreed that if we were to make the best use of our time and the time of

Top, left to right: Clifford J. Johnson, county extension director; Richard G. Bullard, Council Bluffs; Arthur S. Thoreson, district conservationist. Bottom: Don Anderson, Honey Creek; W. C. Strohbehn, Neola; Ernest Harms, chairman, Underwood.

Soil Conservation Service personnel, all educational work and planning must be done in groups," said Commissioner Don Anderson. To call this to the attention of the public a special meeting was held at Underwood, Iowa, December 14, 1944, honoring the 19 farmers in Group 1 who had developed conservation plans (100 percent of the farmers in the watershed signed up). About 100 other farmers were also present. Frank Mendell, state conservationist, Chris H. Jensen, chairman of the State Soil Conservation Committee, Harry Linn, State Secretary of Agriculture, Carl Smith, extension supervisor and R. H. Musser, regional conservator of the Soil Conservation Service, spoke briefly at this meeting.

At times we have invited the County Board of Supervisors, representatives of civil groups and of other governmental agencies to meet with us to discuss mutual problems and work out plans for the jobs to be done. These meetings have resulted in demonstrations on highway erosion control being established, conservation speakers appearing before the Kiwanis Club, etc.

Eight groups were organized in 1944 and 21 farm plans were completed.

Thus far in 1946, 5 groups have been organized, 12 farm plans completed and we have on file 182 additional requests for farm plans.

GRASS FOR THE VALLEY

(Continued from page 39)

width, is traversed by a main highway and a railroad, which provide the chief arteries of travel into Alabama from the north. The entire valley is visible on each side throughout its 100 miles of length. A finer show window for soil conservation cannot be imagined, Hugh Comer says.

What he would like to see is for State and local chambers of commerce, bankers and other business groups, civic clubs, farmers, soil conservation district supervisors and others to get together and roll out a green welcome mat to Alabama from one end of this valley to the other. He's confident it could be done, because he's done it on a small scale on Avondale Farm, and made it pay.

FOOD CHAINS AND LAND USE

"We must plan how to use our land to its full capacity," Dr. Edward H. Graham, chief biologist of the Soil Conservation Service, told the Conference on Conservation, Nutrition and Health in Athens, Ohio.

"There is a new group of scientists called ecologists. These men are familiar," Dr. Graham explained, "with man and his relationships. They know about food chains from the bacteria in the soil on through to man. They know about the pyramid of numbers. In other words, the number of what kind of animals can live in dependence upon how many of another species. They recommend the fertilizing of a farm pond for fish production because they know that the fertizlier is the foundation of the food relationship that proceeds from the nutrients in the fertilizer to the microscopic plants to minute invertebrates to insects to fish that finally reach the table as food for man. Almost everything we do with the land involves a similar chain of influences. The New York child may never associate milk from the bottle with cows. The condition of the soil underlying the pasture upon which the cows graze is even more foreign to him. Yet the soil determines the nutrients available to the grasses in that pasture and the quality of the grasses affects the cows that feed upon them and the meat and milk that they produce. The quality of the milk determines the health of the child. Hence, land use is important to the child in the metropolis who may never see a blade of grass growing."

REVIEWS

NEW WORLD TO WIN. By C. J. J. Van Rensburg and E. M. Palmer. Bloemfontein, Union of South Africa, 1946

When told that we in America are delighted to have his book, that we feel we can learn more about South Africa from it than from a dozen others—scientific, travel, and otherwise—Van Rensburg was only mildly interested.

"We didn't write it for Americans to learn about South Africa," he said to me in Washington the other day. "We wrote it for the children of South Africa. It's for young bushveld Zulus. It's for European farm children, and for blacks in the kraals of Basutoland, Swaziland, and other native states. It's for children of the Karroo and Free State where multitudes of hungry sheep and goats have turned good ranching country into rocky desert. In South Africa we do not have a country-wide soil conservation program. We have only a few patches of real conservation, and thus far there is no way to spread it as you are doing in the United States."

"When we wrote the book," he continued, "we hoped we could make a beginning toward educating the young natives, at least get them to understand what is happening and show them a few things they can do to stop the terrible erosion and the drying up of water sources."

For years this man Van Rensburg has been the apostle of soil conservation in his native land. As soil erosion expert with South Africa's Department of Agriculture, and as a private citizen deeply concerned about the Union's devastated lands and low food production, he knows every corner of the country. His stirring motion picture of uncontrolled erosion—*South Africa in Danger*—has had wide showing, and his persistent harping about drying rivers, parched, denuded grazing country, mountain slopes gullied to ribbons, and underfed people in the midst of money wealth has aroused many of his fellow countrymen to the urgent need for an all-out attack against erosion. Under his charge and direction, the Rust der Winter and Kietondale experiment stations have been developed into excellent soil conservation demonstrations which today are striking evidence that a great part of South Africa's wasted and barren land can be restored if effective measures are taken in the immediate future.

Van Rensburg, called "Van" by his friends in this Service, is now in the United States studying all phases of our soil conservation program. "Your work in soil conservation districts I must see," he says.

Co-author Eve M. Palmer, of the National Veld Trust, a private conservation association, has had much to do with conservation education in her country. In her writings, you get the feel of the land and people of that far-southern nation. You know the witchdoctor claiming credit for a brief shower upon a burnt mountain farm. You find the bitter karoo bush from the desert country encroaching on the highlands "where the rivers are born," and natives stacking manure cakes to "cook our supper." Miss Palmer is known as a writer who can make Africans understand what she is writing about.

And so *New World To Win* is especially designed for those who have in their hands the fate of this southernmost nation of Africa—to a large extent African natives. In spite of the Union's mines, her fabulous cities built with diamonds and gold, more than half the population (8¼ million blacks and 2½ million whites) earn their living off the land. Yields of important food crops are among the poorest in the world, and in rural areas and on the fringes of cities real hunger and dietary deficiencies have become serious problems. By telling this authentic and intimate story of the rapid decline of the land and water of their country, for the youth of their country, the authors have performed a true service for South Africa. If *New World To Win* reaches those for whom it is intended, it should do great good.

The text has extraordinary simplicity. It is perhaps the simplest and clearest book of its kind ever printed. It makes the people and animals of South Africa one with soil, water, and vegetation. That in itself is an achievement of note, as conservation writers and educators everywhere will agree. For example, by reducing the scientific equation of "capillary attraction" to the common denominator of the "mealie patch" hanging precariously from a Drakensburg cliffside, in one-half page, the authors put themselves 'way out in front in the difficult business of explaining the balance of nature for Nature's own children.

Extreme care was taken in putting the book together. There is first a section on food, with emphasis on the food habits of natives as related to present-day land conditions in the semiarid country. Then, soil and water and plants, and why the goat boy no longer can find browse for his herd and water and food for himself. And, with almost incredible skill, the authors have woven through the brief chapters the profoundly complex problem confronting South Africa today—the problem of the Orange River watershed stretching a thousand miles across the continent, with its denuded sources, its "bone-dry tributaries, and its silt-laden flood waters." It could have been no simple matter to show so vividly what is happening to the great river system and far-away valley lands, as well as close mountain slopes, when natives chop down all trees and

sweep clean the soil to build their hut towns on the very backbone of the mountains, cultivate the land around them, and "set fire" to get new green grass for their countless hungry animals.

The second half of the book is conservation farming; and here is the new world to win, if and when the people of South Africa learn enough about it to attack their problems wholeheartedly.

Free use is made of contrast, both in text and pictures, to explain simple soil and water conservation methods: good and bad veld management, the necessity for fodder reserves if cattle are to be raised in large numbers in future; rotations to maintain wheat, maize, and even sugar cane production; contour farming, strip cropping, terracing, where land must be plowed in that country "unsuited to a plough agriculture." In two pages the *why* of contour farming is explained. In one additional page the five steps of laying out the contour are set down in language any Transkei native girl can understand. "In the Transkei, the men don't work. They plaster their faces with mud and dance around," said Van.

Land reclamation may one day be a major work in South Africa, for millions of acres have been completely denuded of vegetation by burning, chopping, overgrazing, and steep-slope cultivation. Indeed the situation would seem quite hopeless were it not for those few places where modern conservation methods have been tried and found good. One is the northern Transvaal farm reclaimed by Dr. Hans Merensky, diamond king, who "turned from diamonds which were dead to soil and water conservation which are living things." The farm, once a "great, sad, eroding piece of land," is now one of the finest soil conservation demonstrations to be found anywhere.

The authors show that it is not hopeless, that South Africa need not become a southern Sahara. They say that much of even the Orange River dry country can be revegetated. The water table in the Karroo can be raised and the old ranching country reclaimed. Gullied lands at the tops of watersheds can be healed by reforestation and regrassing.

Through the book flows a pattern for getting vegetation back on the land and at the same time restoring fertility and growing better livestock, better crops. Simply by naming the grasses, trees and shrubs familiar to the people in everyday life and telling what they are good for, the authors point to the difference between good and bad land use. South Africa can get back her camel thorn trees, her Kaffir-wait-a-little trees, for fuel, so manure and compost materials need not be burned but can be returned to the soil for humus, "the very blood of the soil."

Of such intimate, down-to-earth stuff is this book made. Remember, it is for South Africa. As for us—Americans—here is a thorough study of the land conditions, water, plants, animals and people of South Africa, and a lot of African geography that can't be gleaned from maps.

—Phoebe O'Neall Faris

THE LAND RENEWED. By William R. Van Dersel and Edward H. Graham. 109 pages. Oxford University Press, New York, N. Y., 1946. $2

This is an outstanding book for a number of reasons.

For one thing, this detailed account of soil and water conservation was written to interest 12-year-olds. What's more, it does. This reviewer watched a couple of moppets, 12 and 13 years old respectively go from the first to the last page without pause. It's that kind of a book.

But the odds are that *The Land Renewed* will not find its largest audience among youngsters. It's too good a bet for the busy adult who would like to get a broad understanding of soil and water conservation in an hour's interesting reading. Anyone at all interested in the land will be fascinated by this unpretentious little book. But the chances are that it will be most admired by the professional conservationist. Knowing his complex specialty as he does, he will be amazed at how completely soil and water conservation has been set forth in a hundred odd pages of simple prose—in large type—and dramatic photographs. It's all here—never technical, always thorough, accurate, and fast moving. Anyone who has ever tried to sketch even the broadest outline of soil and water conservation in an hour's conversation will be particularly impressed by what has been done here.

But the appeal of *The Land Renewed* goes beyond skillful editing. Dr. Van Dersal and Dr. Graham are distinguished biologists, well-known within and without the Soil Conservation Service. But there is no hint of "talking-down" anywhere in this book. The authors have simply presented the facts, in word and photograph, and let these facts speak for themselves.

"The food we get is only as good as the soil it comes from," they write. "If the soil is poor, so is the food, whether it looks good or not * * * Our soil is exactly as important as the food we eat. Poor soil—poor people. Rich soil—healthy people. This is one reason why all of us have a personal interest in American land * * * We know that a great quantity of good land is the key to the power and freedom of our Nation.

With that introduction, the authors go on to describe what has happened to America's land—"as much land as there is in Ohio, Indiana, Illinois, Wisconsin, and Missouri so eroded that today it can no longer be cultivated."

Then, in one-page chapters illustrated by facing photographs, the story of how the land can be built back is told. It has never been told more clearly. Orchards, pasture, odd spots, fields, and meadow—the parts of typical farms in various sections of the country. You can see the wasted land in the photograph; you can read the outlined treatment; you can see the land renewed. Without leaving your armchair, you can visit a score of these renewed farms in an hour, and see the pattern of farming that the authors so rightly call "Design for Living". Reading *The Land Renewed* is a stimulating experience. It will be a pity if the schools don't grab this for a text.

—J. A. Smith

REFERENCE LIST

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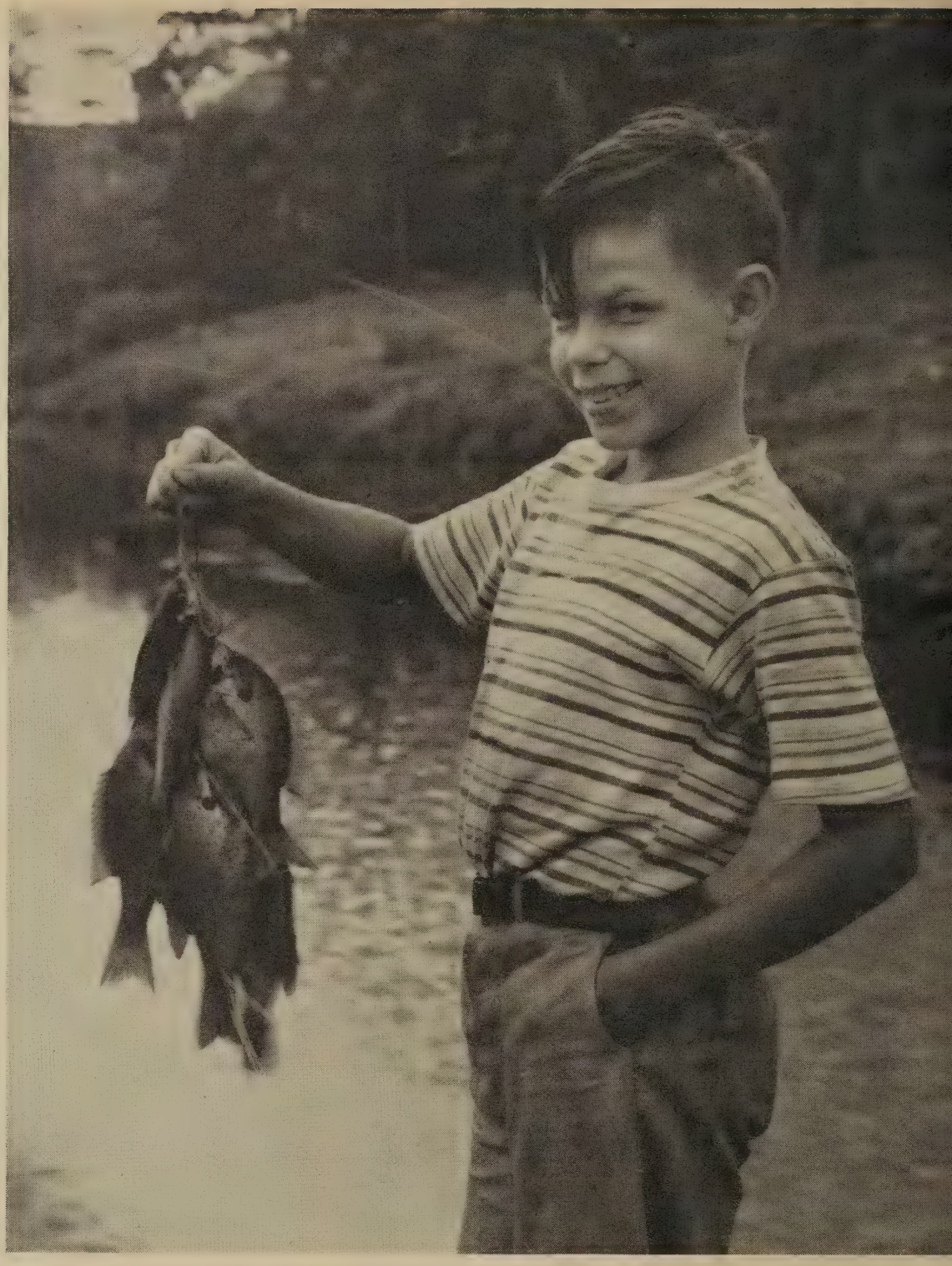

The happy smile on the face of Georgia's Bobby Thompson has been duplicated by many persons who have fished farm ponds during the past few years. About 15,000 ponds have been carefully stocked and are now being managed by farmers and ranchers in soil conservation districts. They yield blue-gills like those Bobby holds and large-mouth bass, as well. The fish are a supplemental source of food highly valued by many farm families.

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OCTOBER
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SOIL CONSERVATION

OFFICIAL ORGAN OF THE SOIL CONSERVATION SERVICE

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SOIL CONSERVATION

CLINTON P. ANDERSON
SECRETARY OF AGRICULTURE

HUGH H. BENNETT
CHIEF, SOIL CONSERVATION SERVICE

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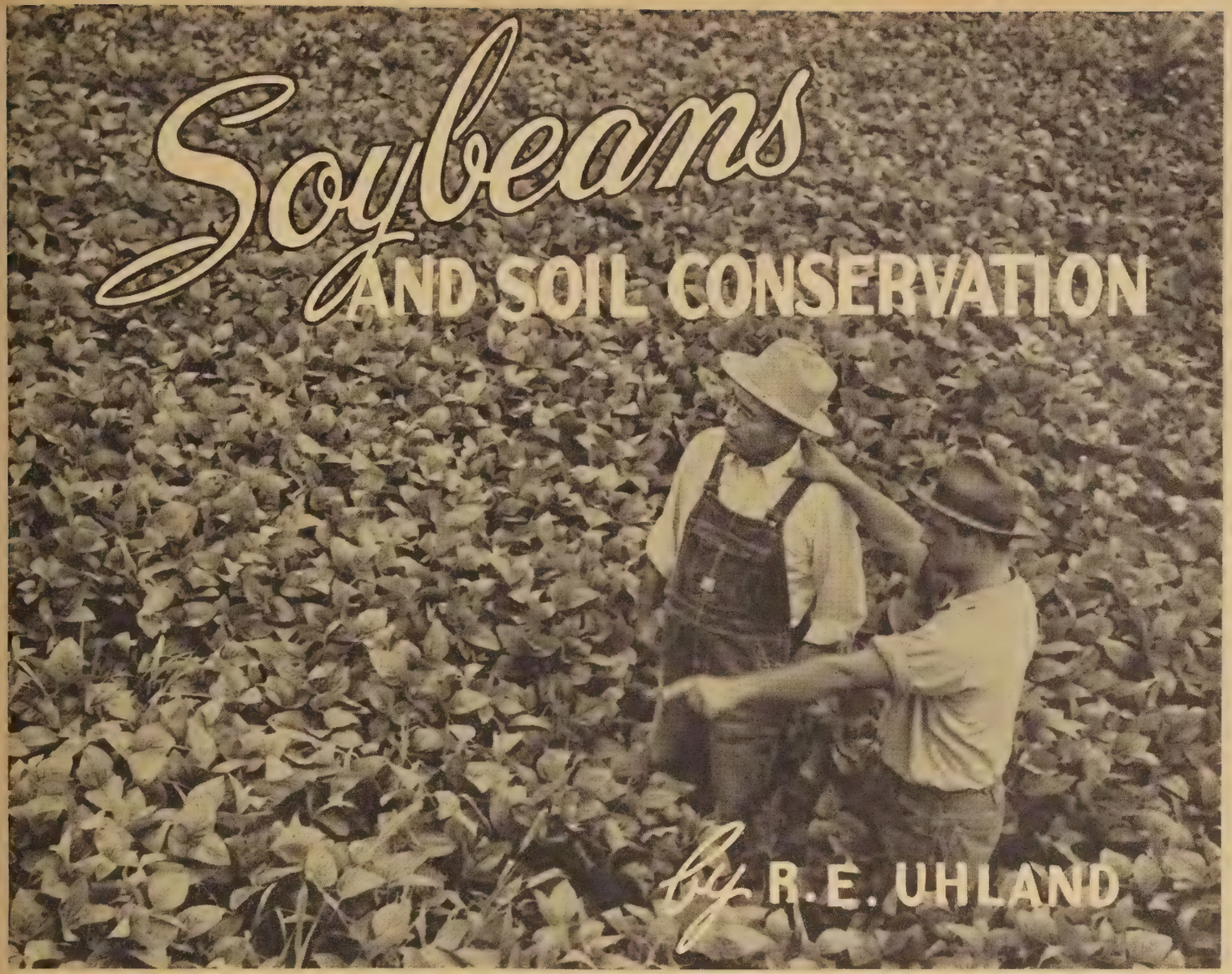
WELLINGTON BRINK, EDITOR

CONTENTS

Front cover: Ranch horses like this one seen on the range near Lame Deer, Mont., develop their intelligence, beauty, and stamina on good grass—not in dust bowls. (Photo by courtesy Farm Security Administration.)

SOIL CONSERVATION is issued monthly by Soil Conservation Service of the United States Department of Agriculture, Washington, D. C. The matter contained herein is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business, with the approval of the Director of the Budget SOIL CONSERVATION seeks to supply to workers of the Department of Agriculture engaged in soil conservation activities, information of special help to them in the performance of their duties. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., 10 cents a copy, or by subscription at the rate of $1.00 per year, domestic; $1.50 per year foreign. Postage stamps will not be accepted in payment.



Drilled soybeans give good protection against erosion at this stage of growth.

SOYBEANS may be handled so as actually to help in maintaining the productivity of the soil, whether grown for hay or for seed.

When soybean hay is fed and the manure spread back on the land, about 70 percent of the hay's plant nutrients is returned. Little consideration has been given, however, to the plant nutrients contained in the soybean leaves, stems, and roots, or to the protection they can give to the soil against erosion if returned to the soil when the crop is harvested for seed. Growers, therefore, should be concerned with returning to the land as much of the nitrogen gathered from the air and as much as possible of the mineral matter taken from the soil.

Early investigational work on the analysis and yields of the different plant parts were carried on by the author at the Missouri Agricultural Experiment Station, and by H. L. Borst and L. E. Thatcher at the Ohio State Agricultural Experiment Station. The findings are reported in Missouri Agricultural Experiment Station Bulletin 279—February 1930, and Ohio Agricultural Experiment Station Bulletin 474—November 1931. The analysis reported covers 4 years' work at Missouri and 6 years' work at Ohio. The data given supply us with a good basis for determining the value of different parts of the soybean plant when returned to the land.

Soybean varieties differ widely in time of maturity, character of stem and leaf, and adaptation to length of season. Some varieties have numerous branches, others few. The Missouri studies

NOTE.—The author is research specialist, Soil Conservation Service, Washington 25, D. C.

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No contouring, too many successive crops of soybeans—disaster!

were continued from 1925–28, with the Virginia variety grown on two different types of soil. The studies at Ohio—made on the Manchu and Peking varieties—were started in 1922 and continued until 1927, but were not reported until November 1931.

The nitrogen determinations made on the various parts of the plants harvested at different stages of maturity made it possible to measure the total yield of nitrogen for the different harvests and also to determine its location in the plant. The nodule counts and root analyses gave an index of the nitrogen-fixing activities of the crop. As indicated by table 1, the amount of nitrogen found in the roots was quite low, averaging less than 4 pounds per acre. This indicates that if much nitrogen is to be added to the soil, it is necessary to return more than just the soybean roots. Cutting the hay at time of maximum harvest would have removed 115.7 pounds of nitrogen per acre. At the last harvest, when the seed was mature, most of the leaves had fallen, and they had lost some of their nitrogen. If the beans had been harvested with a combine there would have been from 40 to 45 pounds of nitrogen returned. The maximum yield of nitrogen in the tops for 1928 was 134 pounds per acre when drilled solid, and 101 pounds for soybeans planted in rows and cultivated. In 1927 when soybeans were grown as a catch crop, the hay contained 57.2 pounds of nitrogen when drilled solid, and 35.8 pounds when cultivated.

Table 1.—Pounds per acre of nitrogen in roots, leaves on plant and on ground, stems, and pods of Virginia soybeans at different stages of maturity. (2 years' results at Columbia, Mo.)

Stage of maturity	Roots	Leaves on—		Stems	Pods	Total plants
		Plant	Ground			
4 weeks before maximum harvest	2. 6	45. 2	-----	14. 2	-----	62. 0
2 weeks before maximum harvest	3. 8	58. 5	-----	23. 7	24. 6	110. 6
Maximum harvest	3. 7	31. 1	19. 1	19. 2	46. 3	119. 4
2 weeks after maximum harvest	2. 4	13. 7	17. 6	16. 3	57. 1	107. 1
4 weeks after maximum harvest	2. 2	6. 3	14. 8	13. 3	69. 9	106. 5

Assuming that all the nitrogen contained in the dropped leaves would have been returned to the soil and that 70 percent of the nitrogen in the

When C. A. Van Doren cut these soybeans for hay little residue remained to guard the soil against erosion.

Lessened erosion, increased yields, from contoured rows.

Soybean residue, left on surface, protects against erosion.

harvest hay would have been returned in the manure, there would have been a return to the soil of 71.8 pounds in the cultivated crop of 1925, 107.5 pounds in 1926, and 93.8 pounds in 1928. It was calculated that slightly more than half of this nitrogen came from the air. By combining the soybeans for seed, it was estimated that there would have been a return of 51 pounds of nitrogen in 1925, 67.5 pounds in 1926, and 63.5 pounds in 1928.

The investigations of H. L. Borst and L. E. Thatcher at Ohio showed that earlier sowing dates for the Manchu and Peking varieties were more conducive to higher yields of seed than of forage. Hughes and Wilkins at the Iowa station at Ames reported similar findings. Table 2 shows the average pounds per acre of the principal plant nutrients found in the soybean leaves, stems, pods, and seeds for the Manchu and Peking varieties. Maximum yields of nitrogen were obtained while the seeds were forming in the pods and before many leaves were lost. As was the case at Missouri, the nitrogen in the stems and leaves decreased rapidly as the plants matured. Part of this decrease was due to the movement of nitrogen from the stems and leaves into the seed while the rest was returned to the soil. The data shown in

table 2 were secured when the soybean plants had matured and when more than 45 percent of the nitrogen was in the seed.

Table 2.—Pounds per acre of principal plant nutrients found in leaves, stems, pods, and seeds of Manchu and Peking soybeans. (Average for 2 varieties for 4 years at Ohio Agricultural Experiment Station)

Plant nutrients	Leaves	Stems	Pods	Seeds	Total tops
Calcium	57. 5	14. 6	11. 4	2. 2	85. 7
Magnesium	25. 2	12. 1	6. 5	2. 3	46. 0
Potassium	29. 3	16. 2	15. 7	18. 6	79. 8
Phosphorus	7. 3	3. 3	2. 6	9. 8	22. 9
Nitrogen	55. 3	17. 6	21. 8	78. 5	173. 1
Dry weight plant parts	2, 333	1, 655	1, 046	1, 046	6, 080

At maturity, if only the seed had been harvested, about 94.5 pounds of nitrogen would have been returned to the soil. If all the hay and seed had been taken off the land, it would have represented the removal of 85.7 pounds of calcium, 46 pounds of magnesium, 79.8 pounds of potassium, 22.9 pounds of phosphorus, and 173.1 pounds of nitrogen per acre. If only the seed had been harvested, however, the average losses would have been 2.2 pounds of calcium, 2.3 pounds of magnesium, 18.6 pounds of potassium, 9.8 pounds of phosphorus, and 78.5 pounds of nitrogen. This emphasises the loss, especially of nitrogen and organic matter, when the soybean straw is burned or is not returned to the land.

L. E. Thatcher, of Ohio, found that for 6 years, soybeans cut about the middle of September contained 7 pounds of nitrogen per acre in the roots, as compared with 4.9 pounds when harvest was delayed until the first week of October. At the September harvest, 39.1 pounds of nitrogen per acre was in the leaves, 14.7 pounds in the stems, 12.6 pounds in the pods, and 51.6 pounds in the seeds. When the harvest was delayed 2 weeks, 19.7 pounds of nitrogen was found in the leaves, 9.9 pounds in the stems, 10.1 pounds in the pods, and 72.1 pounds in the seeds. It is apparent that much of the nitrogen moves from the stems and leaves into the seeds. It is difficult to determine the extent of this movement, because of leaf-dropping as the soybeans approach maturity. The 6-year average showed that the amount of phosphorus removed by the crop harvested in either middle September or the first of October was 30 pounds of P_2O_5, equivalent to 150 pounds of 20-percent superphosphate. The amount of potassium removed by the crop on these two harvest dates was 39 to 41 pounds of K_2O, equivalent to 78 to 82 pounds of muriate of potash.

It is generally recognized that a crop of soybeans leaves the soil loose. Observations and experiments have shown that the soil erodes easily following the removal of the crop, especially, when it is cut for hay. C. H. Van Doren and R. S. Stauffer reported on the effects of crop and surface mulches on run-off and soil losses on a 4-percent slope at Urbana, Ill., in volume VIII of Soil Science of America in 1943. The experiments showed that when artificial rainfall was applied to clean-cultivated soybeans at the rate of 1.75 inches per hour on a 4-percent slope, the run-off was practically constant after the second hour. The run-off at the end of the first hour in April 1942 was 74 percent and in June 1942 was 85 percent. The soil loss for the first hour in April 1942 was 3,362 pounds per acre, and in June 1942 it was 4,881 pounds. At the end of 2 hours, 10,383 pounds of soil per acre had been moved off the plot, and 89 percent of the 1.75 inches of rainfall was running off.

Where the soybean residue consisting of all the plants except the seed was returned to the surface, the run-off at the end of the first hour for October 1941 was 47 percent, and at the end of the second hour it was 62 percent. In April 1942, the run-off was 25 percent at the end of 1 hour and 47 percent after the second hour. The soil loss for October 1942 was 1,168 pounds per acre for the 2-hour period, and in 1942 it was 2,394 pounds. Thus, it is seen that the soil loss for October where the soybean residue was returned was only 11.2 percent as great as where the residue was not returned. The residue was still active the next April, as the soil loss was 23 percent of the soil loss without the residue.

Use of early maturing varieties allow for early harvesting of the soybeans and the seeding of winter grains or cover crops earlier than is possible with late maturing varieties. Winter cover crops which have a week or more advantage, when conditions are favorable for rapid germination and growth, will generally produce much more organic matter and give better protection to the land. Late planted cover crops cannot be expected to give much protection against erosion in the fall and winter, and their growth the next spring is much behind those crops that have an early start and thus establish a well-developed

(*Continued on page 59*)

The Church IN RURAL RECONSTRUCTION

by EUGENE SMATHERS

WHEREVER man denies his stewardship of the soil and despoils the earth, the church is called upon to reclaim judgment, in the name of God, and preach repentance as the only way to reconstruction and renewal. And, positively, through the whole range of its program of worship and teaching, it should seek to develop an understanding and love of the land as God's most precious material gift, "A land which the Lord thy God careth for: the eyes of the Lord thy God are always upon it, from the beginning of the year even unto the end of the year." (Deut. 11:12.) The church should help its people, especially these on the land, to see the scientific principles of good land use as the laws of God, and to understand that the scientist, who humbly and honestly seeks to discover and apply these laws, these ways of God revealed in the very structure of the physical universe, is acting in harmony with the petition: "Thy will be done." This implies that the church and its leadership should gain an understanding of the programs of the various agencies working for the restoration, conservation, and enrichment of the soil, and become a champion of such programs in the local situation, encouraging its members to participate, such participation being one effective means of exercising their stewardship. Only as the church is able to motivate its members to cooperate in these action programs can the principles of its faith become operative in our daily affairs. God works for the reconstruction of His world and for the well-being of man through other than ecclesiastical channels.

There is growing awareness in the church that poor land means poor people, poor not only economically but in all of the ranges of human experience. Eroded, wasted soils mean weak, inadequate institutions, of which the church is one. T. S. Buie, on the basis of a study of a group of churches in South Carolina, has provided a concrete illustration of the close relationship between the adequacy of church programs and the condition of the soil. The greater the erosion, the lower the soil fertility, the less effective were the churches. So from the point of view of its basic faith and also as a matter of soil preservation, the church has a stake in the soil.

* * *

The church should experiment with means and methods of improving land tenure practices, at the local level, and for helping young families become established on farms of their own. The National Catholic Rural Life Conference, the Town and County Committee of the Protestant Churches, and the Jewish Agricultural Society are working on these problems. The Church of the Brethren has established a land purchase fund from which, upon the recommendation of the pastor and officers of a local church, a young couple may secure assistance in the purchase of a farm. Other denominations are working on similar plans. The Church of the Latter Day Saints has made family settlement a traditional policy. Some of us believe that the denominational boards, which now have thousands of dollars invested in stocks and bonds, could well invest some of this money in land, and thereby both receive a return on their investment and make an investment in new families on the land. There is

NOTE.—The author is secretary, Friends of the Soil, Black Lick, Tenn. His article is taken from a paper presented at the Fifth Annual Conference on Conservation, Nutrition, and Human Health, Athens, Ohio.

much which local churches can do even though they do not have a special plan or fund for helping families secure land.

Calvin Schnucker, while pastor at Titonka, Iowa, was able during a period of 6 years to lift the percentage of owner-operated farms within his parish from 34 to 60 percent. He began by preaching on farming as a way of life, the need for thrift if a young couple were to become owners, the need for scientific training in the successful operation of a farm. While trying to get these ideas across to his young people, he surveyed his parish to determine what lands were for sale. Then he went over these available farms with the county agent to determine whether the price was in line with productive capacity. Finally, when a young man had saved something to apply on the purchase price, his pastor took him to the banker and county agent for advice in selecting a farm. The pastor's recommendation made it possible for the young man to secure more generous credit terms than might otherwise have been possible. In this rather informal way and without the investment of money, one church was able to change the tenure situation within its parish. The church can also be of assistance in encouraging a greater degree of self-subsistence and more diversification.

Since the problem of land conservation is basically a matter of attitude, it is also a problem of inward desire. The best of land can become a rural slum where there is no desire for anything better. On the basis of years of research and experimentation, done by the college of agriculture, the experiment stations, the Soil Conservation Service, and various other public agencies interested in conservation, we have the "know-how" to rebuild and enrich our soils. But the "know-how" without an inward compulsion to use our information is ineffective. Most farmers know that rows on the contour prevent erosion and improve crop yields, but many now still run the rows up and down the hill. We have the problem of creating the desire to exercise our stewardship through the practical application of that which we know. And in the final analysis, it is the farmers who must restore and conserve our soil resources. Unless farm people believe that life on the land is worth preserving, they do not have this inward compulsion to save the soil. If we who live on the land despise our calling, if we are continually hankering after the fleshpots of the city, if we do not have the opportunity for a decent and wholesome life, if we do not see the social significance of our labors and the possibilities they afford for becoming fellow-workers with God, we will not be good stewards and the fruits of our abuse and exploitation of the soil will make us despise rural life even more.

Therefore, the church and all other agencies concerned with rural reconstruction must be interested in every effort to improve the quality of living among rural people and to assist rural people to appreciate the values inherent in their way of life. The church, in cooperation with other agencies which help form public opinion, can help nonfarm people to recognize the importance of the farmer in our modern, industrial society. The farmer will recognize his social responsibilities to the degree in which society recognizes his social significance. And if farm people are to believe that life on the land is good, they must have adequate rural institutions and facilities. A poor rural school is as much a symptom of erosion as a huge gully. Inadequate educational opportunity is a contributing cause, as well as a result, of erosion, for it detracts from the desire of rural people to maintain the land. How can we expect people to treat the soil as a trust for coming generations, when the children of the present generation are the victims of an inadequate educational system? The same is true of poor churches, poor roads, lack of electric power, and modern plumbing and other home conveniences: They all create dissatisfaction with rural life. These latter are material concerns but they have an important part to play in determining the attitude of people on the land.

I consider the problem of rural health and medical care. In a report to a senate committee some weeks ago, Charles F. Brannan, Assistant Secretary of Agriculture, summarized some startling facts which debunk the common idea that rural people are the healthiest citizens. Rural health care is about 40 years behind the times, and this is especially important when we realize that rural areas are the seedbed of future population. While a little over 40 percent of our population live in rural areas, over 50 percent of our children under 15 years of age live on farms. Fifty-three out of every one hundred farm boys of 18 and 19 who came up for the draft were rejected for physical defects. This was 40 percent higher than that of all other population groups. The death rate of mothers in childbirth is a third higher on farms than in

cities. The death rate of babies is a fourth higher. Typhoid fever claims three times as many farm as city victims. Despite the fact that 43 percent of the population is rural, only 18 percent of the doctors are in rural localities. The same is true of hospitals, and yet there are usually empty beds in rural hospitals. In 1941 the average city family spent $26 for medical care. The average farm family spent only $14. In the face of these facts, can we expect farm people to feel that life on the land is good?

Substitute good schools, active churches, all-year roads, electrification, more adequate medical care and recreational opportunities, better housing, and these, combined with a recognition of the values of rural living, can go far in making farm people feel that their way of life is good and in creating the desire to preserve that way of life for their children's children. The church, especially in rural areas, should help safeguard and strengthen the values inherent in rural life. Two of these we have already mentioned; man's moral relationship to the earth as the steward of the Eternal, and the dignity of ownership. Other similar values included: The primacy of the family, the significance of mutual helpfulness and cooperative effort as concrete channels for the expression of the Christian spirit of love, the contribution of the small community, the dignity of the rural vocation where labor has intrinsic as well as instrumental value, and the possibility of an integral life.

* * *

I would like to share with you the account of what one rural church has done to contribute to the local task of rural reconstruction. This church is located in a small, isolated, disadvantaged community on the Cumberland Plateau in East Tennessee. The land is not of the best originally, although it responds to proper use. Markets are remote. Incomes are secured from farms, timber, "public works," and allotments of various kinds. Practically all the families live on land which they own or are buying, and from which they win their subsistence. Much of the land remains to be cleared.

From 1917 until 1934, the development of the community was inspired and guided by a resident woman community worker. The church was organized in 1921, and was served by an absentee pastor until 1934, when the present pastor moved to the community. During these twenty-odd years some progress has been made toward the development of a Christian community, though there have been many disappointments, failures, and shortcomings. This goal of Christian community is a fleeting one and much remains to be done. But I would like to describe some of the indications of movement in the direction of the goal.

There was no church building in the community in 1934. The public schoolhouse was used for worship and for other services and activities. Believing that every community should have a house of worship and that worship of God is the care of Christian community, the first efforts of the new pastor and his fellow workers were given to the building of a beautiful, appropriate, functional church plant. Since the average cash income of the families was less than $100 per year, the money for the building was provided by an interested friend. But the work was done largely by voluntary labor, under the supervision of the pastor. Construction was started in October 1934, and the building was dedicated May 30, 1935. This building, constructed by loving hands of plain country folk, became not only a house of worship which stands as a silent symbol of God's presence in the midst of His human children, but also provided facilities for an enlarged church and community program, and was evidence of the power of togetherness and cooperation, even among a "poor" people.

At the time the church was built, a church farm, or potential farm, of 23 acres was purchased. Some of this has been developed and serves as a means for supplementing the minister's income, affords him a means of larger identification with his people, makes possible some simple demonstrations in good land use and in improved farming methods.

A recreational program for youth, which has been one of the major elements of the church program, developed slowly in the face of many difficulties: Prejudice, puritanical religion, opposition of neighboring preachers. Recreation is not used as "bait" but is provided, not adequately even yet, in response to a basic need of youth and as a contribution to the satisfaction of rural living. A house of play was planned and construction started when the war came and the sudden loss of manpower made volunteer labor impossible.

This community is 14 miles from the nearest town and doctor. A few years ago one call from a doctor cost the families from $15 to $25. This

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was a large percentage of the average annual cash income of many families, so a doctor was called only as a final recourse and often too late to be of any benefit. The minister spent a considerable portion of his time taking people to the doctor. The problem of health and medical care was tragic. The Church of the Great Physician could not pass by on the other side. So with the help of the mission board, a resident nurse was secured and a health program inaugurated in 1938. The community, again working under the direction of the pastor, erected a house of health which serves the dual purpose of residence for the nurse and a clinic center. The work of the nurse was largely in the homes, with an occasional emergency cared for at the center. A monthly mother-and-well-baby clinic was held, preventive measures and health education were emphasized, school health examinations made by the county public health service were followed up with corrective measures. A loan fund for medical care was established. Since January 1943 this program has been discontinued because nurses could not be found, but will be resumed later. Plans are under way for the construction of a modern county hospital in the county seat with outlying clinic centers, of which the house of health will be one.

Behind so many of the problems of this small community was the economic problem, the need for larger incomes resulting from improved use of local resources. In the winter of 1937–38 a farmers' school was conducted at the church, bringing in experts who told the farmers what to do. This was a poor educational procedure and little benefit came from the effort. In 1938, the minister and some of the leaders "discovered" Nova Scotia and learned what had been accomplished there by fishermen, miners, and farmers, whose economic situation was very similar to that locally. Through study-for-action, progress had been made in the solution of many of their problems. It was decided that this might offer a technique for finding the means whereby some of the pressing problems of their community could be solved. So in the winter of 1938–39 study clubs were organized, and continued each winter thereafter until the war. Neighbors met together to study their common problems and to seek their solution through concrete and united action. Experts were brought in to help answer the farmers' questions. Individuals developed, farm practices were greatly improved, and some cooperative enterprises were developed.

One of the latter, the Farmers Association, has made and is making a valuable contribution to economic improvement by making available the services of machinery which the individual farmers are unable to own. This association now owns and operates a considerable list of tools, including a tractor, sawmill, small thresher. And as soon as available, additional tools will be purchased.

In 1940, in response to the need for providing an economic opportunity for some of the older boys, and with the conviction that the land provides the best foundation for a Christian home, a church homestead project was inaugurated. This project, administered by local leaders, purchases farm or undeveloped land and sells to young families on a long term payment plan, with every possible safeguard for the homesteader and his family. To date 25 individuals or families have been assisted in the purchase of land, and 11 have completed their payments. Additional loans have been made for home and farm improvements. A community forest has been established and an addition made to the church farm. Additional land is held for future farms, and money, accumulated through payments, is available for future purchases.

A community shop has been constructed, and will be equipped with the proper tools when available. A woodworking project is under way with the assistance of a specialist from the college of agriculture. An electric line is forthcoming. In 1943 the community was selected as an area demonstration in soil conservation. This was the fruition of years of cooperation with the public agricultural agencies. As a part of this project a community organization has been set up and definite goals for community improvement are chosen each year, and monthly meetings are held looking toward the realization of these goals. A hot lunch program in the public school has been sponsored.

Along with the activities, the traditional church program has been maintained. World vision has been emphasized. Every opportunity to bring visitors from other races and nations to the community is welcomed. Church leaders cooperate in county and regional affairs. In these ways one rural church has tried to make its contribution to rural reconstruction.

Rural reconstruction, as is that of our total civilization, is basically a religious problem, a problem of values. Mere manipulation of man's environment is not enough. Knowledge of the

physical bases for the good life is not enough. The use which we make of our knowledge and of the power it places in our hands is the essential thing. Human values must determine our use of knowledge and our social arrangements, if civilization is to be saved. To what purpose do we save the soil, unless with it we save men, unless man's relationship to a restored, fertile soil contributes to personality and community?

If rural life, in America and in the world, is to be reconstructed, we all must, in cooperation with God, do the rebuilding. Each of us must share in the great redemption, city-dweller and countryman alike. Rural reconstruction can be accomplished only as we see ourselves as tenants of the Almighty and "as time writes on the face of the earth our care of the land and in our own faces our care of each other."

> Three things must man possess,
> If his soul would live and know life's perfect good—
> Three things would the all-supplying Father give—
> Bread, Beauty, and Brotherhood.
>
> —*Edwin Markham.*

When we acknowledge, all of us, that we are tenants of the Almighty, keepers of the Holy Earth, brothers one of another, then will the land become what God intended, a garden in which man by and through his labor accepts these three essential gifts: Bread, Beauty, and Brotherhood.

SOYBEANS AND SOIL CONSERVATION

(Continued from page 54)

root system during the favorable growing season in early fall.

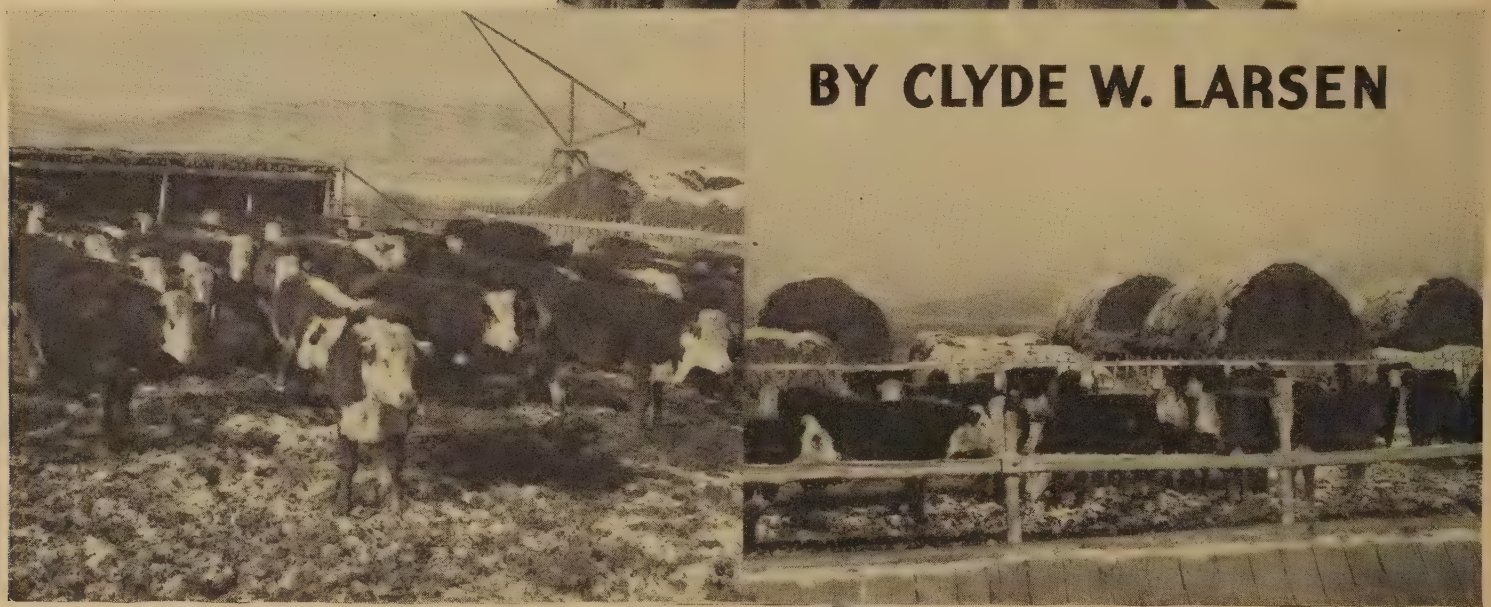
Erosion may be reduced further and more fertility saved by delaying the preparation of the land and the planting of the soybean crop a week or more in the spring. At this time of year, the growth of the hay or cover crop is very rapid, and the increase in organic matter may be measured in hundreds of pounds for every day that plowing is delayed. Additional savings of soil and fertility may be made by drilling the soybeans in 8-inch rows instead of 42-inch cultivated rows. Contouring is recommended for all sloping land whether the beans are drilled solid or planted in 42-inch rows and cultivated.

From these runoff and soil-loss data it is obvious that by returning the leaves, stems, and pods of the soybean plants to the soil surface a large saving of soil and water will result. The soil loss from land where the soybean hay was removed and the land left bare was 129 times as great as where it was mulched with 2 tons of wheat straw. By removing only the soybean seed and leaving all the leaves, stems, roots, and pods on the land, more than half of the nitrogen contained in the soybean is returned, and erosion is also markedly lessened.

IN colonial times the strength of the British Navy depended upon the old maids of England. The old maids kept cats, the cats ate mice, there were fewer mice to disturb bumblebees' nests, more bumblebees caused better pollination of red clover, more red clover seed made better pastures, and better pastures produced better beef to feed the sailors of His Majesty's Navy. This quaint illustration exemplifies the kind of thinking without which we cannot use our land most wisely, for our relationship to the land is complex. The disturbance of a single element in the land's complex relationships may be disastrous if we do not know what we are doing.—*Edward H. Graham.*

THEY MADE A *Master Plan*

BY CLYDE W. LARSEN



BETTER cattle weights, from 3 to 4 extra tons of sugar beets per acre, and a grain yield increase of 6 bushels per acre are the immediate results seen from conservation on the Johnson brothers' farm at Aurora, Utah.

The Johnsons already were applying most of the recommended conservation practices at the time their farm plan was made.

Willard Johnson first established himself in Aurora, a small farming community now in the Sevier County Soil Conservation District. His operations were on a modest scale. But when his three sons grew up they pooled their capital, reorganized and expanded operations. The Johnsons now follow a farm and range plan that is outstanding in its approach to the land capabilities and deficiencies of the area.

As additional acreage was purchased, the Johnson brothers found that soil fertility was badly depleted, that the fields were in need of leveling, and that the irrigation system needed reorganizing. With the formation of the Sevier County Soil Conservation District, the Johnson brothers saw a chance for help with their projected improvements. A farm plan was worked out with the help of Soil Conservation Service technicians which covered 416 acres of irrigated land and 402 acres of range land.

The maintenance and improvement of the fertility of their cropland was the first problem the Johnson brothers tackled. First, they applied phosphate to the alfalfa fields; immediately there were increases in plant growth and yields. Next, they varied the amount of phosphate applied per acre, and found that 200 pounds was the most economical amount to apply, with alfalfa selling at $15 a ton. It was noted that phosphate applied to the alfalfa would increase the yields of small grains and sugar beets the first year the fields were planted in these crops. This increase in yield was not obtained from the alfalfa fields that had not received applications of phosphate. The Johnson brothers decided that if phosphorous would increase the production of grain and sugar beets as they followed in the rotation, a phosphorous deficiency still existed in the soil.

In order to alleviate the deficiency further, the Johnson brothers drilled 150 pounds of phosphate per acre into the grain fields at planting time and side-dressed the sugar beets, using 150 pounds per acre. They discovered that the application of 75 pounds per acre to the beet crop following thinning, and an application of 75 pounds more at the last cultivation of the summer, gave better results than one application. These applications increased the small grain yields from 14 to 20 bushels per acre and the sugar beets from 3 to 4 tons per acre.

But the cropping plan was only part of the scientific management invoked. The Johnson brothers have gradually increased their grazing privileges on the range surrounding their farm until they can run 300 head of cattle. These cattle are allowed to graze on the range from April 20 to October 1, and have to be taken care of on the farm and private range the rest of the year. It was soon decided that steers would fit into the program better than mixed range cattle. At present spring calves are bought the following fall, placed in the feed yards and fed alfalfa hay until it is time to turn them out on the range. These calves are weighed in the spring and again at round-up time when the steers are driven to the farms. The steers are now graded according to size and condition, and placed in the proper feedyard.

The fattening ration consists of alfalfa, corn, wheat, oats, barley, molasses, and sugar beets. After corn is included in the crop rotation of the farm, corn silage will be used in the feed rations.

Last winter, 10,000 bushels of grain, 700 tons of hay, 600 tons of beet pulp, 30 tons of molasses, and a carload of cottonseed pellets were fed. When the steers are first placed on feed, the chopped grain is mixed with the beet pulp, making it impossible for the better feeders to founder from getting too much grain at one time.

Barnyard manure produced in the feed yards

(Continued on page 70)

NOTE.—The author is work unit conservationist, Sevier County Soil Conservation District, Salina, Utah.

THE PICTURES

Johnsons all: left to right—Floyd, a district supervisor; Lloyd, W. R., Vernon and son.

Stock in this feed yard were sold 5 days after being finished on beet pulp, alfalfa, beet molasses, and grain mixture.
At the right is another view of the Johnson brothers' feed yards.

Cattle are fed in a sheetmetal-lined trough in this Johnson yard at North Aurora, Utah.
The farm has installed these two types of headgates. That at the left has an 8-inch drop and a lip in the apron. The other is for a larger ditch.

WE TOOK THE JOB OUT TO THE LAND

BY HUGH BENNETT

FOR 10 YEARS the Soil Conservation Service has operated on a regional basis. The Service has become recognized as an efficient agency; it has gained a reputation at home and abroad for getting the job done fast and well, and Soil Conservation Service procedures are now being used by various other agencies and by a considerable number of foreign countries.

Early in the life of the Service it was decided, for various reasons, not to undertake to do the whole job from Washington. Not that Washington was a bad place to work or anything of that sort, but because the erosion problem is very widely spread about the country and must be solved on the farm.

Accordingly, as much of the work as possible was moved out as close to the land as possible—out where the farmers and ranchers who use the land live.

When I was asked to take charge of a Nation-wide program of soil erosion control, I immediately made up my mind on several points that I considered fundamental. These were along the following lines: We would headquarter in Washington; we would send our specialists out through the country to work with farmers cooperatively; we would treat the land according to its capability (the way the land was made) and its needs (as determined by what man had done to the land); we would carry out a unified rather than a haphazard, piecemeal type of program, indiscriminately applied to the land; and we would check at timely intervals on the effectiveness of the field work by sending out inspectors capable of appraising the job being done for the farmers.

When we started the work in September 1933, I knew on the basis of 30 years spent in studying the lands of America and other countries that we could not possibly succeed except by treating the land according to its capability and needs. That was predetermined by the natural order of things. So, it was decided in the very beginning—and we still adhere to that decision—that we would work as well as we could along with nature, and not against her. And above all, we would not undertake to do the job by inviting farmers into a comfortable room to tell them what to do back on

their farms. Our specialists were told to go out on a farmer's land along with the farmer himself and there decide, cooperatively with him, what could and should be done in each of his fields, each pasture, woodlot, gully, and on every acre of idle land and all other land on the farm in order to conserve soil and water. This was done by going carefully over the entire farm, deciding what conservation work needed to be done on the basis of the degree of erosion, the slope, and the kind of soil, and then drawing up a plan for carrying out a complete and properly integrated soil conservation job on the entire farm.

We could never have achieved the tremendously successful soil-conservation accomplishments of the Service if we had not started in this manner, which combines the scientific basis with a practical approach. And we, of course, recognized the necessity of using the accumulated knowledge of science and practice gained around the world through research and farmer experience.

In doing these things we developed the fundamentally sound procedure of moving as much of the Washington office as practicable out to the land—out to the problem we were asked to solve. This move—this decentralization from Washington—has served the Nation in good stead. The job could not have been successfully done—as it is being done—in any other way.

So regional offices were established in appropriate parts of the Nation. Capable representatives were selected and assigned to the regional tasks of helping the Service get the work done efficiently, expeditiously, and according to the capability and needs of the land. Applicable protective measures were duly coordinated to meet the requirements of the land, the climate, and type of agriculture, as well as could be done within the economic limitations of the farmer, his market opportunities, his inclination, and his working facilities.

Many things I have asked these regional representatives of our headquarters office in Washington to do for the Service out there on the land—pretty nearly every activity we felt was practical to move out of Washington. I told our regional heads that, from time to time, I would send out from my office in Washington other widely experienced representatives, and would also go out myself, in order to check on the work in sufficient detail to satisfy myself that we were doing the best possible job.

There were, of course, additional reasons for this decentralization and method of inspection. For example, we had to account for every penny of money turned over to us by the Government. We had to satisfy the General Accounting Office that what we spent was used in accordance with the laws of Congress and the regulations of the General Accounting Office. We had to abide by the regulations of the Treasury Department of the United States and the rules and procedures of other departments. There were no lump sums of money to do with as we pleased—to spend when, where, and how we chose, without the responsibility of accounting for every cent turned over to us for the specific purposes of doing soil conservation under the guidance and authority of the Soil Conservation Act, Public Law No. 46, 1935.

There were numerous other reasons as to why it was highly advantageous, as well as absolutely necessary, to decentralize as completely as practicable. There were, for example, the exacting requirements of accounting, keeping property records, directing travel, determining needs for purchase of supplies, purchasing facilitating supplies, maintaining leave and retirement records, and looking after many other procedures involved with the activities of the Service and its cooperative relations with other agencies (the Soil Conservation Service now has some 1,920 cooperative agreements with other agencies).

It would not have been at all possible to take care of the required needs for the entire Service's accounting in Washington without hiring a force of accountants and bookkeepers that likely would have been looked upon as top-heavy. And it was well understood that limitations on expenditures and personnel could be imposed by the authorities, such as might easily have made it impossible to keep track of everything an agency of the nature of the Soil Conservation Service is required to account for.

Moreover, it would have been impossible to carry on the most effective type of work, if every move had to be directly controlled by officials at Washington headquarters. There would have been too much waiting and other loss of time. In order to get things done promptly, it was necessary to have our workers stationed close to the job they were appointed to carry out. This was peculiarly necessary in the coordinated type of work program the Service was conducting, under which specialists in various branches had to acquaint themselves with each other's specialty

so that they could work together and perform a completely balanced conservation job on the many kinds of land that make up farms, watersheds, and regions. The specialists charged with conducting the program to a *successful end* not only had to work very closely together but had to make their respective skills fit in with, and lend support to, the conservation measures applied to the land by other specialists. Separately, they could do a piecemeal, unbalanced, and unsuccessful job, such as characterized so much work on the land preceding the inception of the program of the Soil Conservation Service. Working together, they were able to do a well-rounded, properly adjusted, efficient job.

With the regional office set-up there has been much saving on travel and time. All of our employees were duly instructed not to waste a nickel—that before we would waste so much as 5 cents we would turn the funds back into the Treasury. This I also told the Congress of the United States. (See hearings on the agricultural appropriations bill for the fiscal year 1938, House of Representatives, 75th Cong., 1st sess., p. 1064.)

It was proposed at an early stage of the Service's life by a number of earnest people who came to see me that we should ask for an allotment of $125,000,000 a year for the soil conservation job. We probably could have obtained such an allotment, but my expressed wish was that the Service be given a smaller sum for its operations, because it was felt that with a considerably smaller allotment we could do at that time a more technically sound and fully effective job. I knew there were not available then enough well-trained, capable soil conservationists in the country to carry out a good, scientifically applied, conservation program, such as it was my unalterable determination to do, on a too extended scale. What I asked for was $25,000,000. (I recall also that some of the newspapers got hold of this obstinacy on my part and referred to it as the extraordinary behavior of a peculiar variety of bureaucrat.)

Of necessity, headquarters had to be maintained in Washington. It was vitally necessary, for example, to keep continuously in close contact with such agencies as the General Accounting Office, Treasury Department, Department of the Interior, Department of Agriculture, and the Bureau of the Budget. And we had to be prepared to appear at a moment's notice before congressional committees in connection with appropriations for soil conservation and with proposed legislation dealing with such varied subjects as flood control, water facilities, wildlife, and land use.

It was necessary to have other kinds of offices, also, due to the tremendous expansion of demands of soil conservation work throughout the country and out on our island possessions. State offices and later on, following the establishment of soil conservation districts, district offices had to be established, through which our main job of helping the districts is carried on. Congress tells us to serve the soil conservation districts. The districts are "out there" on the land, and therefore most of our technicians must be "out there" too—not in Washington or in some other central place remote from field, haylot, and pasture.

In setting up State offices to help with the Nation-wide soil conservation program, based on local, regional, and national land, climatic, and agricultural characteristics, it was necessary somehow to avoid the danger of having a multiplicity of local programs grow up in the county. That could easily have come about and it could easily have hurt or killed the entire national program. There probably would have been too many viewpoints—too much insistence by too many people that their own particular bailiwick called for its own particular program.

Soil erosion and the environmental features that govern proper land use and protection do not necessarily stop or change at State or any other artificial boundary lines, but they do stop or change in some degree at regional boundaries.

The United States is a big and complex country—too large, too variable for many to familiarize themselves quickly with all its numerous and widely scattered land problems and their solution. Somewhat like a doctor specializing in a particular branch of medicine, it is generally advisable, and often necessary, to have our young soil conservation technicians get acquainted with the problems of the country regionally. Even the problems of a region are sufficiently complex to call for persistent and energetic study on the part of our specialists in order for them to perform the required high-class scientific work that goes with their assignments to a given region. After they have fully mastered the intricacies of the erosion and water problems—which may take 5 years or more—they can be helpful utilized in other regions. But even under exceptionally favorable conditions—exceptional metality, experience,

energy, and love for the land and the work—our specialists are required to move up from the performance of relatively simple tasks to the more difficult operations; and at all times they need the close help and guidance of our more highly trained and experienced technicians.

Before we went into regionalization, tasks were repeatedly arising in various parts of the country that required much more expert attention than could be provided through the use of men whose experience was limited to relatively small portions of the country. Following the setting up of the regions, there was marked improvement almost overnight.

For the above and other reasons, it can be truthfully said that we were really forced into the establishment of regional offices. They have served the national program of soil and water conservation so splendidly—and continue to do so—that I am prepared now, after studying the erosion problem all over the country for 43 years, with 13 of the 43 years successfully devoted to the scientific and practicable solution of the problem, to say, without reservation, that the soil conservation problem cannot be solved without the use of regional offices. I mean exactly that: It cannot be solved in any other way. I am aware of the fact that some people will in all sincerity deny this. They do not know, as do we, that failure to develop a program adjusted to the character and needs of the land under the hundreds of different conditions existing throughout the country would have meant by this time confusion, piecemeal work, and eventual failure of the conservation movement.

Below are some of the reasons that the Service maintains its regional offices:

Regional administration reduces the cost.—The Soil Conservation Service employs many people; buys large quantities of equipment and supplies and keeps records of their use; rents offices, warehouses, and shops for repairing equipment; and performs many other similar functions. Long-time experience on the part of many private enterprises and such agencies as the War Department, Farm Credit Administration, Forest Service, and Federal Reserve System has demonstrated that personnel, fiscal, procurement, and related services can be handled at less cost through regional administration than on either a State or National basis. Handling such services on a national basis, from Washington or any other single point, would tend toward a slow, cumbersome organization. Handling them on a State basis would require the establishment of 48 duplicate administrative service units, which in the aggregate would greatly increase personnel and costs. Our regional offices handle a sufficiently large volume of work (pay rolls, purchases, rentals, services, etc.) to attain peak efficiency of operation without the development of top-heavy administration. For example, we have found that one qualified nursery chief can easily supervise the operation of several of the nurseries used for growing and distributing soil conservation seed and planting stock. In the 12 States included in our northeastern region (region 1) we employ only 7 persons in these nurseries to look after the work, as against a requisite personnel staff of 48 if exactly the same work were handled on a State basis. And our complicated map-making equipment which will print a farm map for one State will do the same thing for another, so that instead of providing 48 or more sets of such expensive equipment, along with the necessary highly trained operating staffs, we get along satisfactorily under the regional system with just 8 map-making set-ups, or one-sixth as many.

Regional administration maintains uniformly high technical standards of work.—In soil and water conservation there is no substitute for knowledge and technical excellence. Neither is there any simple remedy for the ills of the land that can be applied indiscriminately as a standized treatment. There is as much variety in erosion as there is in the landscape, and the landscape is highly complex. Technical supervision of soil and water conservation work can be spread over several States with much greater efficiency from a central regional point, thus reducing cost of such services per State while maintaining a uniformly high standard of work quality from locality to locality and from State to State.

Our region 1 office, for example, is now employing 100 people, 35 of whom are technicians and 65 fiscal, procurement, personnel, and administrative (total personnel.) Total permanent employees, as of December 31, 1945, of the Service in region 1, outside the regional office was 618 including clerical help. In addition, there were on that date 199 temporary employees. Another agency in the Department, because of the character of its program, cannot operate any way *except* on a State basis. This agency as of December 31, 1945, re-

ported the employment of 494 persons at the State level of the eastern region (same 12 States as in region 1 of SCS), not including clerical help, 933 persons at the county level.

Regional administration provides balanced, comprehensively correlated action over large natural areas and watersheds.—By providing program direction on a regional basis, it becomes readily possible to plan and apply soil and water conservation operations effectively over large natural areas, such as watersheds. For example, work done in one part of a watershed may depend for its success on complementary or supplementary work in other parts of the area, regardless of intervening political boundaries. Thus with regional administration, soil conservation work on farms along part of a watershed in one State is not so likely to be nullified by the failure or tardiness of farmers to carry on supporting soil conservation work along the other part of the same watershed in an adjoining State; for under Soil Conservation Service methods, work programs are duly tied in from one region to another.

Regional administration provides for more rapid exchange and application of new ideas and scientific developments. The regional offices are not only equipped to evaluate conservation techniques, but also to disseminate rapidly to all farmers in the region adaptable new ideas and scientific developments for conserving soil and water. Our zone technicians, working throughout large areas, or zones, of essentially similar agricultural characteristics, are constantly reviewing, analyzing, and reporting on work progress and new developments. Thus, new techniques in one locality are made available promptly to all other localities where they may be serviceable.

Regional administration represents the national interest in soil and water resources.—The Nation, as well as the individual, the community, the county, and the State, has an interest—and an obligation—in the protection of our basic soil resource. Future as well as present generations have a stake in the land and most people now recognize that the present and future welfare of the Nation depends on the most careful use of our productive land at all times. Because the Nation has this interest—an inescapable obligation—it established the Soil Conservation Service and provided it with funds.

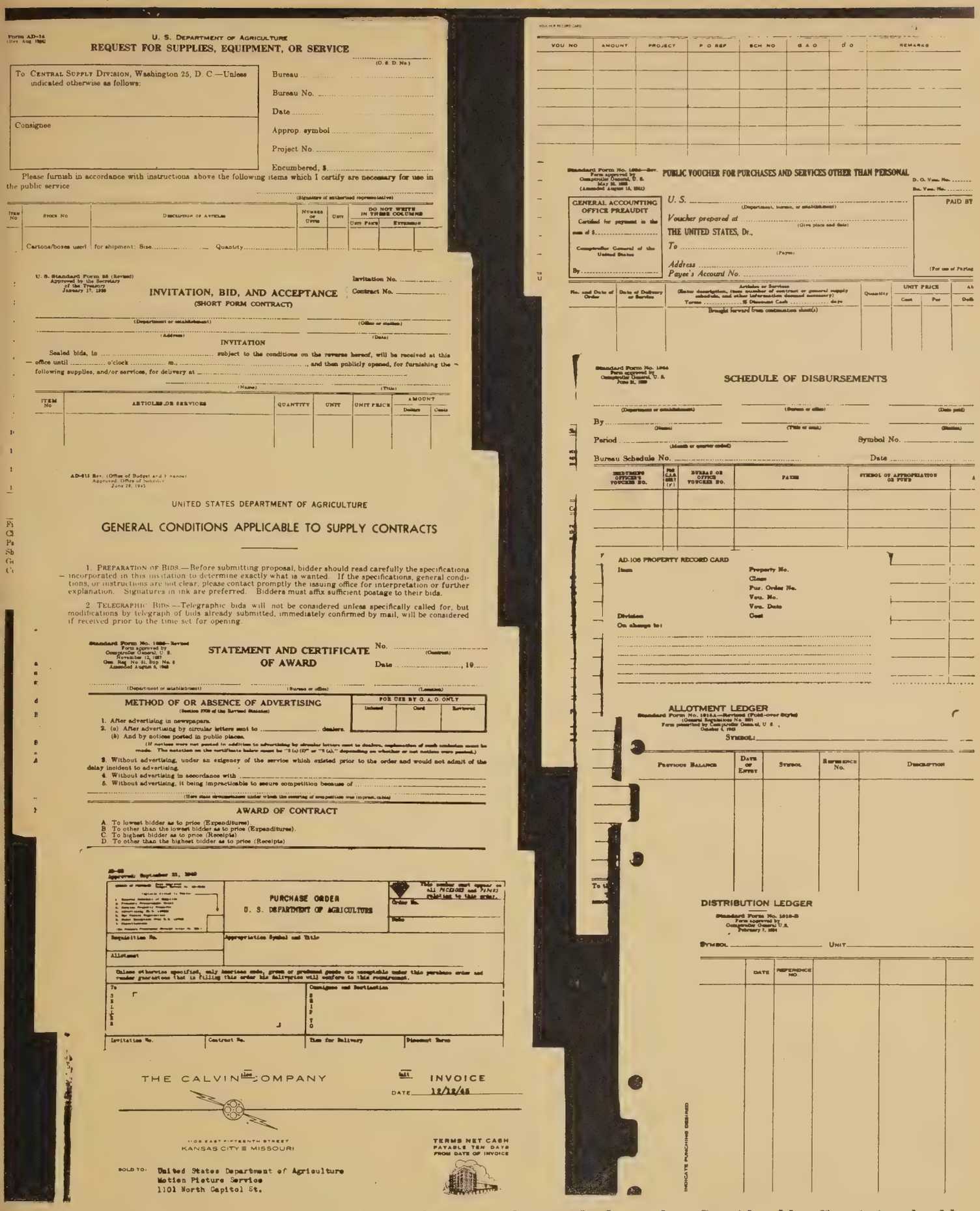
Example of many forms required to complete the purchase of a single item of the thousands of items required in getting the soil conservation job done.—An illustration of what is involved for the purchase of a single item, is given below:

Request for Supplies, Equipment, or Service.
Invitation, Bid, and Acceptance.
General Conditions Applicable to Supply Contracts.
Statement and Certificate of Award.
Purchase order.
Invoice.
Voucher Record Card.
Public Voucher for Purchases and Services Other Than Personal.
Schedule of Disbursements.
Property Record Card.
Allotment Ledger.
Distribution Ledger.

The completion and recording of these forms are concerned with but one of numerous transactions required in handling the complicated fiscal, purchasing, and property-accountability aspects of a large Government organization. The completion and posting of these 12 forms is normally required for nearly every purchase in excess of $100. For purchases involving smaller amounts only the execution of one of the 12 steps is eliminated. Besides the functions indicated, decisions have to be made by the purchasing officer, the auditor, the certifying officer, and accounting officer regarding the legality of the purchase, regulations of the General Accounting Office, the Department of Agriculture, and the Treasury Department, as well as our own Soil Conservation Service procedures. (People sometimes show impatience with such procedures—call it "red tape"—but it's a pretty thorough system of looking after public funds.)

The burden of details that would result from centralizing all such functions as illustrated above for the entire Service in one office would, among other things, lead to delays in getting needed materials and supplies out to the field, as well as delays in settlement of accounts. This would hinder the work of getting conservation on the land and probably would lead to ill-will on the part of establishments with which we do business. Centralization of similar required accounting, purchasing, etc., would require a staff as large or larger than we now have in the regional offices, and we would have less efficient administration.

On the other hand, if these detailed accounting, purchasing, and other similar activities should be required of each of the State offices, little or nothing would be gained and much would be added to costs of operation—the costs would probably be six times as much as at present. Moreover, expert accountants, purchasing officers, and similar clerical assistants are none too plentiful.



U. S. DEPARTMENT OF AGRICULTURE
REQUEST FOR SUPPLIES, EQUIPMENT, OR SERVICE

PUBLIC VOUCHER FOR PURCHASES AND SERVICES OTHER THAN PERSONAL

INVITATION, BID, AND ACCEPTANCE
(SHORT FORM CONTRACT)

SCHEDULE OF DISBURSEMENTS

UNITED STATES DEPARTMENT OF AGRICULTURE

GENERAL CONDITIONS APPLICABLE TO SUPPLY CONTRACTS

1. PREPARATION OF BIDS.—Before submitting proposal, bidder should read carefully the specifications incorporated in this invitation to determine exactly what is wanted. If the specifications, general conditions, or instructions are not clear, please contact promptly the issuing office for interpretation or further explanation. Signatures in ink are preferred. Bidders must affix sufficient postage to their bids.

2. TELEGRAPHIC BIDS.—Telegraphic bids will not be considered unless specifically called for, but modifications by telegraph of bids already submitted, immediately confirmed by mail, will be considered if received prior to the time set for opening.

STATEMENT AND CERTIFICATE OF AWARD

METHOD OF OR ABSENCE OF ADVERTISING

AWARD OF CONTRACT

PURCHASE ORDER
U. S. DEPARTMENT OF AGRICULTURE

AD-108 PROPERTY RECORD CARD

ALLOTMENT LEDGER

DISTRIBUTION LEDGER

THE CALVIN COMPANY
INVOICE
DATE 12/12/45
1108 EAST FIFTEENTH STREET
KANSAS CITY 8 MISSOURI
TERMS NET CASH
PAYABLE TEN DAYS
FROM DATE OF INVOICE
SOLD TO: United States Department of Agriculture
Motion Picture Service
1101 North Capitol St.

Here are 12 forms the Soil Conservation Service has to complete in order to buy a nonemergency item costing over $100. The rule, which SCS didn't make, calls for this—you can't get around it. There is no machine that will process such fiscal procedures; people who know how have to do the work. Considerable effort is involved but, after all, it's a pretty good system. So good, there seems little chance for waste or error in handling Uncle Sam's cash—not in the matter of the actual purchases, at any rate.

Northern Great Plains on the Air!

At least seven terracing demonstrations are scheduled for the Yankton area this year. Machinery is furnished by a local farm equipment dealer. This demonstration was part of the Nation-wide broadcast.

Richard Haeder, Wolsey farmer, and Ross D. Davies, State conservationist of the Soil Conservation Service, being interviewed. Haeder commented, "We can't afford to lose any farming units because of erosion."

A SATURDAY last spring, when radio director John Baker, U. S. Department of Agriculture, said, "That's all from Washington, today," the Nation-wide audience of the American farmer program was whisked across country to the Midwest, to a 160-acre farm in Yankton County, S. Dak. The event was a terracing demonstration on the farm belonging to Joe Yaggie, a cooperator with the Yankton County Soil Conservation District.

Again, the American Broadcasting Co. directed national attention to the soil and water conservation job being done in the Northern Great Plains.

Seven terracing demonstrations were scheduled near Yankton for 1946. Using equipment loaned by an implement manufacturer, farmers are shown how easily terraces can be constructed with ordinary farm equipment. During last spring's broadcast, the five-disc one-way plow was building terraces at the rate of 1,000 feet every 3½ hours.

In his opening remarks, Robert C. "Bob" White, ABC farm director, explained, "Joe Yaggie saw that conservation farming was the only way he had of protecting his rich James River bottomland. It was either save it, or go out of business.

"At this demonstration, the slope above a 40-acre cornfield is being terraced. The slope shows results of considerable erosion, and with the terraces established, runoff will be controlled. This will help stop the slope erosion, and will help protect the bottomland from wash-outs and silting."

Yaggie, who voted for the organization of the local soil conservation district and who was one of the first applicants for technical assistance, places great stock in conservation farming.

When queried about how be became interested in soil and water conservation, Yaggie answered,

Conservation progress on the Richard Haeder farmstead near Wolsey, S. Dak. Top picture taken during 1935 drought; bottom picture in 1943. "There are now 36,000 trees on my unit," says Haeder.

"I had been hearing and reading a lot about conservation farming and the results farmers were getting from it. I could see what was happening on this farm and knew that I had to do something. I went to Yankton and asked Howard Devick, work unit conservationist of the Soil Conservation Service, for help."

When asked if he received help, Yaggie answered, "You can bet I did. I worked out a complete farm conservation plan for 160 acres. This plan is one of the greatest things in the district set-up.

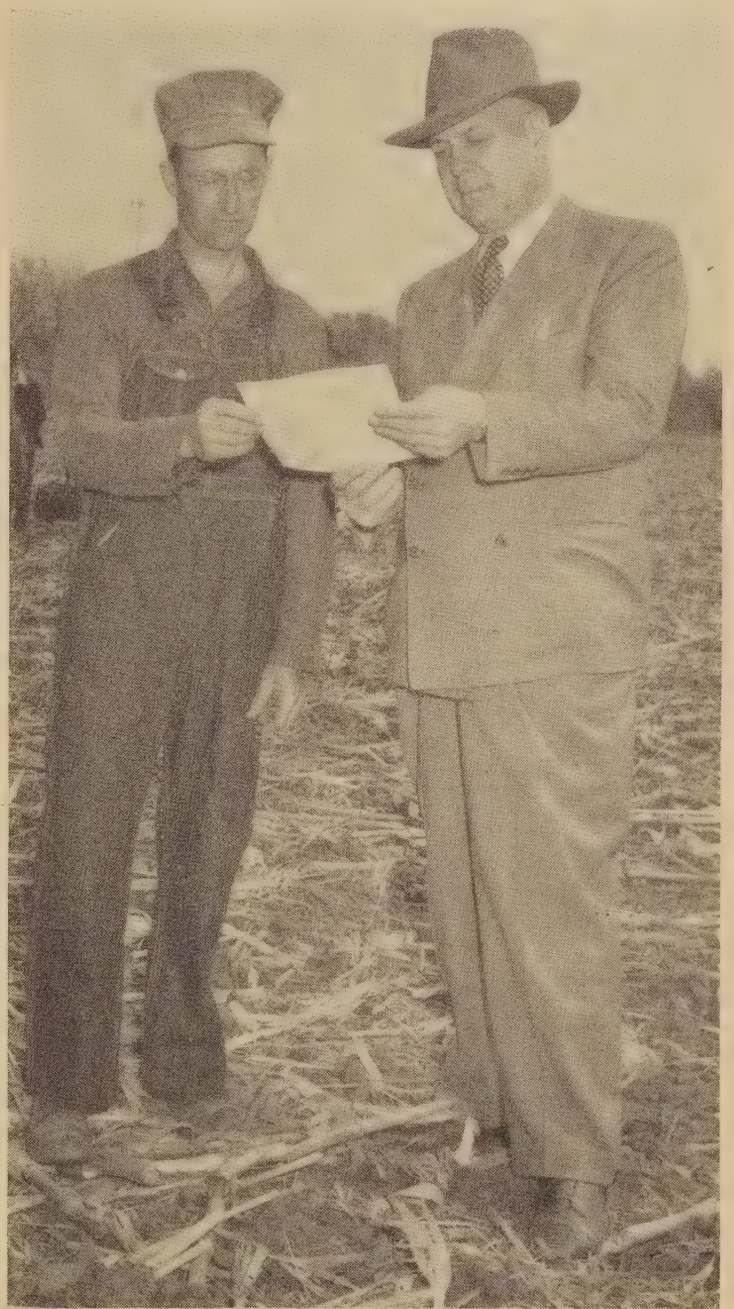
"By using terraces to help hold the water, I'm saving both water and soil," he told his Nationwide audience. "Grasses help me do that job. I plan to put at least half of my farm in grass and plant plenty of trees. And as part of my conservation plan, I'll practure pasture rotation, seed bromegrass, and contour farm."

At that moment, George German introduced Chris Mack, who was ready to take over with another interview. (Both German and Mack are farm directors at WNAX, Yankton.) Chris Mack interviewed Richard Haeder, who operates a farm near Wolsey, S. Dak. Haeder became nationally known through an article published in 1938 in a national magazine which described the erosion conditions on the old Karnstrum farm.

Haeder, who is a cooperator with the West Beadle Soil Conservation District and State President of the REA, related what has taken place on this unit since then.

"In the eyes of the insurance company, it was almost a lost unit," Haeder said. "At that time, we couldn't drive near the farmstead due to the drifts of dust and sand. There were only 6 tree stumps on the land. Today there are 36,000 trees. You have to drive into the farmyard to see the buildings."

Using conservation farming and his farm conservation plan as a basis for operation, Haeder has turned "hell's half acre" into a veritable para-



Joe Yaggie gets his entrance blank for the Greater South Dakota Association's agricultural achievement program from Howard B. Holmes, chairman of the organization's agricultural committee.

dise. After building up the soil for 4 years, 1938 to 1942, Haeder purchased the place from the insurance company.

"It's no longer that burnt-out spot," Haeder commented. "Although many people in the '30's said we could dump the unit in the ocean and not miss it, the results prove that we can't afford to throw any units away. With conservation farming, we can save every one of them."

When Ross Davies, State conservationist of the Soil Conservation Service, was interviewed during the broadcast, he evaluated the Haeder farm as being in the upper 5-percent of the farms in the State.

"And with one out of every 10 South Dakota units now being conservation farmed, more are on the way to agricultural stabilization," he said.

At the conclusion of the broadcast, Howard B. Holmes, chairman of the agricultural committee of the Great South Dakota Association made sure that Joe Yaggie received an application to enter the Association's Agricultural Achievement Program which is just being launched. More than $1,000 will be awarded to outstanding soil conservation districts and recognition plaques will be given to outstanding conservation farmers.

WNAX, long a proponent of soil and water conservation throughout its listening area, has been devoting considerable time to soil and water conservation programs.

Chris Mack said that the station recently inaugurated a half-hour Saturday evening broadcast specifically designed for conservation farming. Titled, "Land and Soil Conservation," the program is scheduled for 26 weeks and is cooperatively aired by extension directors from South Dakota and five adjoining States. WNAX also established a $42,000 scholarship fund for 4-H Clubs.

For their activity in the past year along lines similar to the conservation broadcasts, WNAX was given three radio awards in 1945. The station received the Alfred I. DuPont Award, the Variety Showmanship Award, and the American Public Relations Award.

"And for an announcement of a soil and water conservation job well done, keep your eyes and ears turned to the Midwest," was Mack's closing plug.

THEY MADE A MASTER PLAN

(Continued from page 61)

is spread over about 100 acres of cropland at the rate of 15 tons per acre. The manure is spread just before spring plowing by farm-owned manure spreaders and a tractor-loader built by Vernon Johnson. It is of interest to note that the Johnson brothers still find it incumbent to apply phosphorous to their farm land, even though barnyard manure applications cover the entire farm land every 3 years.

Inadequate spring range was another problem which the Johnson brothers faced when they started to expand their operations. After talking this problem over with Doyle Lund, district conservationist in the Aurora area, the Johnson brothers accepted his suggestion to seed 30 acres of the ranch on Loss Creek to an irrigated pasture mixture. This pasture was first grazed in the summer of 1945. It provided 160 cow-months of feed, taking considerable pressure off the early spring range. This was reflected in the average gain in weight of the steers as they increased from 275 pounds in 1944 to 350 pounds in 1945. Some of the gain undoubtedly traced to the fact that 1945 was a very good range year. Because of the good results from irrigated pastures, the Johnsons doubled their acreage in the spring of 1946.

To find out whether there is a nitrogen deficiency in the soil, the district supervisors have requested Soil Conservation Service technicians to help the Johnsons in setting up observation tests in one of their best fields. This field will receive its usual allotment of barnyard manure before plowing, and ammonia nitrate fertilizer will be applied so that each strip can be harvested and weighed separately.

The district supervisors also suggested that the irrigation system be improved. The Johnsons are installing concrete turn-out gates at key points in this system. Forty-seven gates were installed in 1945. These turn-out gates will provide more positive control of the water and will facilitate its uniform application.

Minor drainage and alkali problems remain to be solved before the Johnsons will be satisfied. Leveling is being completed and a drainage study is being initiated.

Thus, a coordinated approach to the problems of managing farm and range land is being effected.

USE OF MINERAL FERTILIZERS

Dr. Emil Truog, professor of soils at the University of Wisconsin, evaluated the importance of organic matter in the soil at the Fifth Annual Conference on Conservation, Nutrition, and Health, at Ohio University, recently.

Dr. Truog said:

"Much ado is being made today about the great importance of soil organic matter in relation to soil fertility, soil conservation, and crops of satisfactory nutritive value. This, in part, is as it should be, because soil organic matter is of tremendous importance. It facilitates the intake of water and thus reduces runoff and erosion. It also favors workability or ease of cultivation, aeration, and drainage. Fresh organic matter contains all of the elements needed for plant growth, which, as decomposition proceeds, are released in forms suitable for new plant growth.

"However, to say that chemical fertilizers, such as superphosphate and muriate of potash should not be used to make up inevitable deficiencies of nutrient elements that cannot be supplied through the use of organic matter is just pure 'bunkum.' Absolutely no evidence exists to the effect that the judicious use of mineral fertilizers is at all injurious to soils, or tends to produce crops which are unsatisfactory as feed for animals or food for man. In fact, evidence, almost without end, now exists showing clearly that the use of mineral fertilizers on depleted soils promotes the growth of crops which have superior nutritive values.

"The fertility and organic matter content of gardens and other small areas may be maintained through the use of animal manure and composts. This use of composts is both feasible and commendable. However, when large areas are involved, as is the case in general farming, this practice is not feasible because of the impossibility of preparing and applying the enormous amounts of compost which would be needed. Fortunately, in general farming it is both convenient and profitable to follow a rotation of crops which provides the necessary organic matter in the form of crop residues (stubble, stalks, and roots) and animal manure produced in the feeding of crops. All that is required to make this system supply the needed organic matter is the proper use of lime, phosphate, and potash.

"It is sometimes said that 'nitrogen spells organic matter.' This means that liberal supplies of nitrogen promote such luxuriant growth that large additions of organic matter naturally follow. In the atmosphere over every acre of land, there exist in round numbers 35,000 tons of gaseous nitrogen. If these 35,000 tons of nitrogen were all transformed to a fixed (non-gaseous) form such as ammonium nitrate, the product would have a commercial value as fertilizer of over $5,000,000. How can the farmer draw upon this tremendous and inexhaustible supply of nitrogen? It is by growing legumes, which, when properly inoculated and fertilized, have the power of fixing atmospheric nitrogen which they can then use for the synthesis of proteins. Non-legumes, regardless of how grown, cannot utilize atmospheric nitrogen. They are dependent for nitrogen on that fixed by the legumes, or supplies in manure and commercial fertilizers."

INDIANA'S "WEEK"

Of the many special "weeks" devoted to worthy causes, few have exerted the permanent impact of Indiana's 1946 Soil Conservation Week.

Proclaimed by Governor Ralph F. Gates, who earnestly appealed to "all citizens, both rural and urban, privately and through their organizations, to protect and conserve the fertile fields of our fair State," the Week drew enthusiastic support from schools, churches, radio stations, clubs, theaters, and newspapers. There were demonstrations and tours conducted by county agents, district supervisors, vocational agriculture teachers, and Soil Conservation Service technicians. Much attention focussed on the educational and pioneering contributions of Indiana's Extension Service, in preparing the way for soil conservation on the farms.

The week, April 22–29, captured the interest of many persons not ordinarily reached by the soil conservation program, and whetted the desire of farmers in several counties to organize soil conservation districts of their own.

The high price of wives is impeding South Africa's soil conservation program, Dr. A. R. Saunders recently told a convention of British Empire scientists. The custom whereby young natives have to pay several heads of cattle for their brides has led, he said, to overstocking and overgrazing, with serious damage to native lands as a result.

REFERENCE LIST

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U. S. GOVERNMENT PRINTING OFFICE: 1946

NOVEMBER
1946

Indian Summer in Nevada

SOIL CONSERVATION

OFFICIAL ORGAN OF THE SOIL CONSERVATION SERVICE

ITED STATES DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

SOIL CONSERVATION

CLINTON P. ANDERSON
SECRETARY OF AGRICULTURE

HUGH H. BENNETT
CHIEF, SOIL CONSERVATION SERVICE

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WELLINGTON BRINK, EDITOR

CONTENTS

SOIL CONSERVATION is issued monthly by Soil Conservation Service of the United States Department of Agriculture, Washington, D. C. The matter contained herein is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business, with the approval of the Director of the Budget. SOIL CONSERVATION seeks to supply to workers of the Department of Agriculture engaged in soil conservation activities, information of special help to them in the performance of their duties. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., 10 cents a copy, or by subscription at the rate of $1.00 per year, domestic; $1.50 per year foreign. Postage stamps will not be accepted in payment.

Where WILL DISTRICTS GET TREES?

BY JOHN W. KELLER

PLANTING of forest trees is encouraged by Government agencies in nearly all parts of the United States, not only where rainfall is sufficient to keep the planted trees alive but in many places where irrigation is required. In humid areas tree planting is recommended for wood production; in the Great Plains for windbreaks to protect farmsteads, crops, and livestock; in all regions, for conservation of soil and water. Without tree planting it would be difficult, if not impossible, to put on an effective soil conservation program in some parts of the country. On many steeply sloping areas trees are the only kind of cover that will hold the soil. The dense cover of pine needles conserves water and prevents soil erosion. According to Soil Conservation Service estimates, almost 12 million acres in fields and gullies in the United States should yet be planted to trees by cooperators in soil conservation districts. To plant such an area, more than 12 billion trees would be needed.

Pine needle litter in an 8-year-old loblolly pine plantation which effectively conserves the moisture and prevents soil erosion.

At the 1945 rate of planning by SCS technicians, it would take 130 years to complete plans for this much plantings. At the 1945 rate of tree production, the 12 billion trees would become available only over a period of about 200 years. At the 1945 rate of planting, 425 years would elapse before the work was finished.

In 1945, SCS technicians planned tree planting as the best use for 91,754 acres of land. This brought the total area of fields and gullies for which they had planned such use to 473,510 acres. In that year 25,000,000 trees became available to district cooperators for planting, and the cooperators planted trees on 25,873 acres. This brought the total of land they had so planted to 219,350 acres. We hope that in 1946 the total area planned will be increased by 183,508 acres. Our goal for 1946 is double the 1945 figure. We have every reason to believe that this goal will be reached.

New soil conservation districts are being established almost daily. Planning procedures are being simplified. The Service has entered upon a planning schedule that calls for planting more than 200 million trees each year. To catch up with the plans made, to the end of 1946 district cooperators would have to get hold of more than 428 mil-

NOTE.—The author is assistant chief, forestry division, Soil Conservation Service, Washington, D. C.

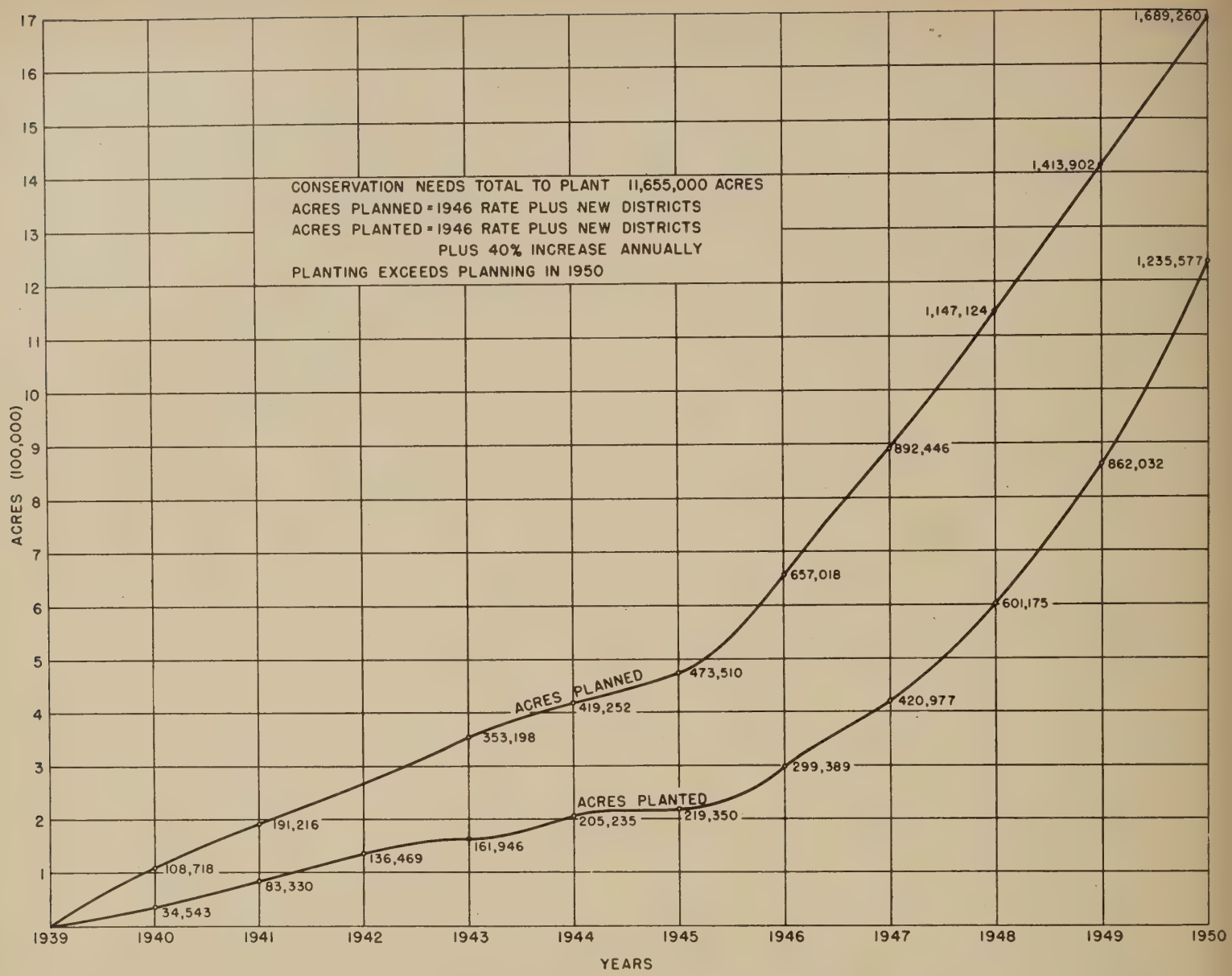

Figure 1.—Forest tree planting planned by SCS technicians and carried out by soil conservation district cooperators. The planning curve was projected on the basis of the 1946 trend of increase; the planting curve was projected on a corresponding basis with an additional increase of 40 percent annually. In each instance, the expected increase in number of soil conservation districts was taken into consideration.

lion trees. Only about 60 million trees are in sight, however.

Since 1940 when the present records were started, SCS planning has exceeded planting by a greater and greater margin. We are now planning more than twice as fast as cooperators are planting. Companion curves are shown in figure 1, based on actual tabulations for 1939–45 and on calculations for 1946–50. Not until 1950 does the gap between planning and planting become narrower.

Obviously, this means that we are not getting the job done and we are not getting sufficient protection against erosion. Tree planting on farms must be stepped up if the soil resources of our country are to be saved. The planner recognizes the need for tree planting. The cooperators agree, and want to plant. But the existing supply of trees falls far short. To give district cooperators an extra incentive, in each region the SCS has offered to furnish a limited number of trees to any cooperator. We buy "incentive" trees from State nurseries if they are available. Otherwise, so far as possible, we grow them in SCS nurseries. The number of trees produced in SCS nurseries dropped from 143 million in 1940 to 20 million in 1945. This was due partly to wartime labor shortage, partly to recognition of the fact that Clark-McNary nurseries are logically the main source of forest-tree planting stock. Nurseries operated by State foresters with Federal assistance under the Clark-McNary law, fell off in production from 98 million trees in 1941 to less than 38 million in 1945. Commercial nurseries cannot be depended

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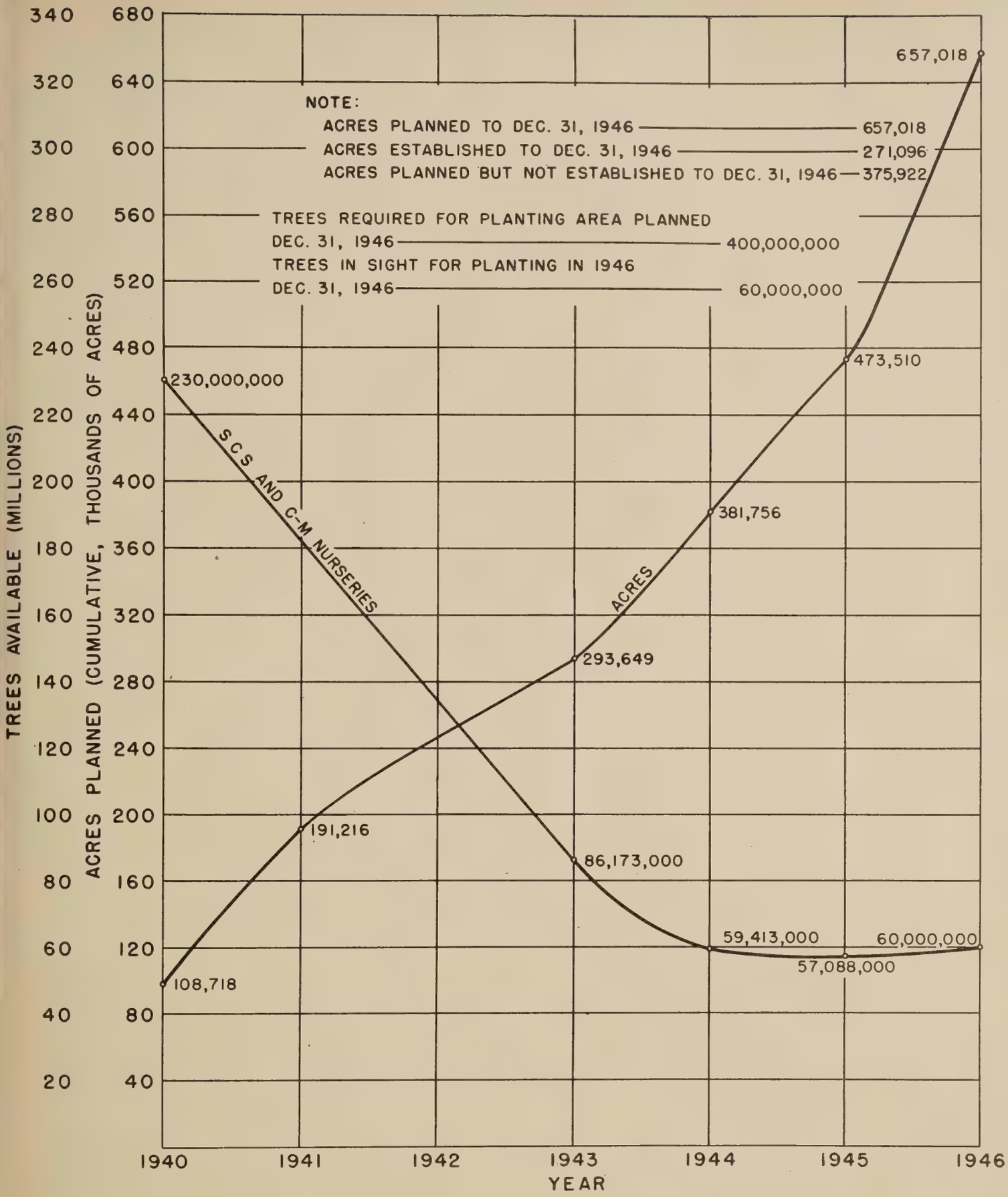
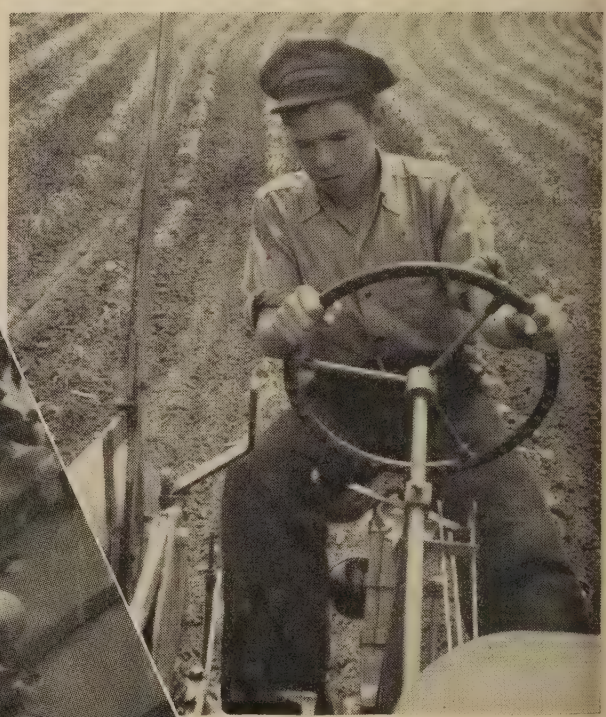


SOIL CONSERVATION SERVICE, WASHINGTON, D. C., 1946

Figure 2.—Acreage of fields and gullies for which forest tree planting has been planned in 1940–46 by SCS technicians, in contrast with numbers of trees that have become available for such planting during that period in SCS and Clark-McNary nurseries.

Introducing InLaC



by DOROTHY ROWE

English farmers whose fruit trees need pruning may be able to engage the services of Jack Blackwell if InLaC should happen to send him overseas. Jack is pruning 1 of 1,500 producing trees in a 15-acre peach orchard in South Carolina.

At present Roger Yule is a bit young for InLaC. Later he may have a chance to show English farmers how he plows corn on the contour in Faribault County, Minn.

Farmer Blubaugh's daughter-in-law is good at picking high-yield apples. If she takes after her famous father-in-law (see pp. 51–52, *Soil Conservation* for September 1944) she has plenty of up-to-the-minute ideas on farming to pass along to others.

WHEN young people back a movement, watch out! They're clever at thinking up new ways of doing things—and quick to put those thoughts into action. The International Land Club is in process of being organized in America. InLaC (for short) already is under way in Great Britain. One of its aims is to help young people see for themselves how other nations are meeting their postwar land problems.

Here is how it will work out. Young people in Great Britain and the United States will visit each other's countries to widen their knowledge of proper land use. As the plan develops it may later be expanded to include young people in agricultural communities in Europe as well as in America and the British Empire.

InLaC membership will comprise girls and boys of 17 and over who give evidence of a genuine interest in the land and in rural life. An important byproduct of the venture is that it will foster friendship and good relations between English-speaking nations and the peoples of Europe.

By 1947, when the organization will begin to function, it is expected that youth ships may be operating between England and the United States, offering the round trip at a cost as low as $75 plus $1 per day for food.

The heavier expenses of overseas travel will be financed by a central fund, and a current account for local administrative expenses will be financed by subscription. At present all work is being done voluntarily, and all funds are being raised by members. But when the first exchanges have been successfully carried out, grants will be sought.

In England members are raising money for the central fund by arranging dances, entertainments, and whist drives. The young people are preparing for visits abroad by becoming informed on conditions in other lands. At the same time they are storing up knowledge about Great Britain and the Empire. Youth hostels will be a meeting place for club members and overseas visitors.

The exchange plan was drawn up to help young people who neither would attend college nor have the means to travel abroad but who would profit from training in world citizenship. The idea was evolved especially from the Women's Land Army in England.

Eventually farmers in the United States will have an opportunity to indicate whether they can use the services of English workers and if so, how many. This will help the directors in placing the young people to good advantage. Similarly, district supervisors interested in having some of the young people from their districts get farm experience in England will be asked to forward their names to the proper authority.

Already Mr. and Mrs. Monroe Smith, co-directors of American Youth Hostels, Inc., have offered a year's work to a member experienced in dairying. The organization has a farm in connection with its International School at Meredith, N. H., where members were trained for emergency labor during the war and were then placed on New England farms.

At Washington Court House, Ohio—about 30 miles from Columbus—arrangements are being made for an exchange of English land workers and local farm youths. Ohio has a group of young land workers who are practically organized, according to Harry Culbreth, organization director of the Ohio Farm Bureau Federation. This group corresponds in age to the InLaC membership: 17 to 35. The young people are those who wanted to join the armed forces but could not be spared from the farm. "They are enterprising, with a great capacity for raising funds," said Director Culbreth.

Besides American Youth Hostels, Inc., and the Ohio Farm Bureau Federation, other organizations that have volunteered assistance are: The English-Speaking Union, Associated Country Women of the World, Youth Hostels Association, National Farmers' Union, National Association of Girls' Clubs, the National Council of Women, and the Y. W. C. A.

How do young people in this country regard InLaC? Two girls who were among the first to put in an application to go overseas wrote as follows:

> We are both tremendously interested in the idea. Though we realize that living conditions abroad are not easy, we are anxious to work hard and do our best to make the project a success. We both have had quite a bit of farm experience and feel that we may be able to help on whatever needs to be done.
>
> We are particularly interested in living with a farm family, if that is possible, since we want to learn something about the life of the country. We realize that the amount we could earn would not cover our expenses, and are able to pay a good part of them.

There's no telling how far InLaC will go once it gets a good start. Certainly there never was greater need for putting soil and water conserva-

(*Continued on page 81*)

GIRL SCOUTS *Save soil*

by FANCHON HAMILTON
CAMP ADVISER of GIRL SCOUTS

ACTUAL practice in the use of good conservation methods provided both fun and useful skills for 48 senior Girl Scouts from Ohio, Kentucky, and West Virginia who attended Camp Molly Lauman near Lucasville, Ohio, last summer.

Operated as a demonstration the camp was intended to show what Girl Scout camps all over the country can do in conservation education.

The project was an experiment sponsored by the Girl Scout Regional Camp Committee, with the backing and support of thte National Girl Scout organization.

Consultants from the Ohio Department of Conservation, the Forestry Division of Ohio, the United States Forestry Service, Friends of the Land, the Ohio Reclamation Association and the Scioto County Conservation Club enriched the program and helped to make clear the relation of each phase to the other.

Among the most popular activities were the building of check dams and making of diversion ditches in badly washed areas. Rainy days were anticipated with eagerness because the girls' efforts were proved successful and new work projects turned up. New trails were made and old ones improved by making switch backs where the need was evidenced. Gullies were healed and bare washed areas were staked and covered with brush.

The camp garden was of special interest this year. Besides cultivating the soil and covering the ground with compost mulch, the girls suckered plants and picked off injurious insects. They tested types of soil, and discussed the relation of soil fertility to food and nutrition.

With the help of the forester they learned to heal in trees, to plant and transplant. Pruning was done in some areas. Grapevines and green brier were cut out where they were harmful.

A forest ranger taught the Scouts safety precautions and discussed selective cutting, woods improvement, and good logging practices. Fire prevention and other necessary precautions played a part in each day's activities. The Scouts familiarized themselves with fire laws affecting wooded property. These were observed as they prepared cooking and campfire spots and fire-fighting equipment was kept ready for use at all times.

Throughout the summer the girls learned proper care and handling of tools such as the crosscut

saw, axes, mattocks, fire rakes, shovels, hoes, and spades.

They took observation trips to see good practices in contour farming and strip cropping, as well as areas where much careful planning and application was needed.

These and many more activties were interspersed with the usual singing, folk dancing, swimming, and cooking out of doors.

Trips to the Roosevelt Game Preserve and films loaned by the United States Forestry Service added a great deal to the program.

Each girl is returning to her camp and her community feeling the responsibility for educating other girls and many adults in how to conserve our country's natural resources.

Introducing InLaC

(*Continued from page 79*)

tion practices on the land than there is today. Progressive farmers know that the advantages of safe, scientific farming are many. But if there were only one—the average 20 percent increase in per-acre yields of various important crops—it would still be the key to preventing starvation in other lands.

Mrs. Neve Scarborough, petite, attractive brunette who is setting in motion the wheels of InLaC in America, is enthusiastic about its possibilities and its chances for success. With such inspiring leadership the young members of International Land Club should accomplish much in helping to find solutions for land problems in their own countries. Her enthusiasm is not based on lack of experience either, for she was an executive of the Famous Women's Land Army in England during World War II and knows what young people—especially girls—can do on the farms.

As Soil Conservation goes to press, Mrs. Scarborough reports:

"Our membership in England is growing rapidly, and 25 percent of the members have made their first pilgrimage to Denmark very successfully this year. Next year those whose jobs won't allow them to come so far afield as America or Canada will be going to Holland. And I have now had my first eager inquiries from India, where, it is felt, it should be established to operate provincially first, and then internationally." So we progress, despite the set-backs.

Where will districts get Trees?

(*Continued from page 76*)

upon as an important source of trees for planting by district cooperators. Usually their supplies are limited, and their prices necessarily are high. The total production of trees in Clark-McNary and SCS nurseries in 1946 is expected to be less than 60 million (fig. 2) and, of course, not all the Clark-McNary nursery trees will be available to soil conservation district cooperators.

The Soil Conservation Service is interested in seeing that trees are available not only to meet incentive needs but also to complete the recommended planting. The Service is encouraging State foresters to greater production in Clark-McNary nurseries. It is assisting them to plan accurately by making available to them all the planning figures—total acres planned for tree planting, acres planted to date, and age and kind of trees needed annually to fulfill SCS plans. The Service is encouraging soil conservation districts that need large quantities of trees to operate their own nurseries. It is helping districts which operate nurseries by furnishing technical assistance, the use of available equipment, and supplying some seedling stock for transplanting. Also, it is encouraging private tree nurseries in every possible way to produce trees of high quality at reasonable prices.

What action will be taken by public and private nurserymen to meet the anticipated demand for trees? How will private nurserymen respond? If private nurseries are unequal to the task, the Federal Government must look to the Clark-McNary nurseries. What action will State foresters take to increase production and to grow the trees that are needed?

Tree planting, a very important soil conservation practice, must not be permitted to fail for lack of trees. If private nurseries cannot grow enough, State nurseries should try to do so. If State nurseries fail, then the Soil Conservation Service nurseries must carry the load the best they can until State and private nurseries are ready to take over.

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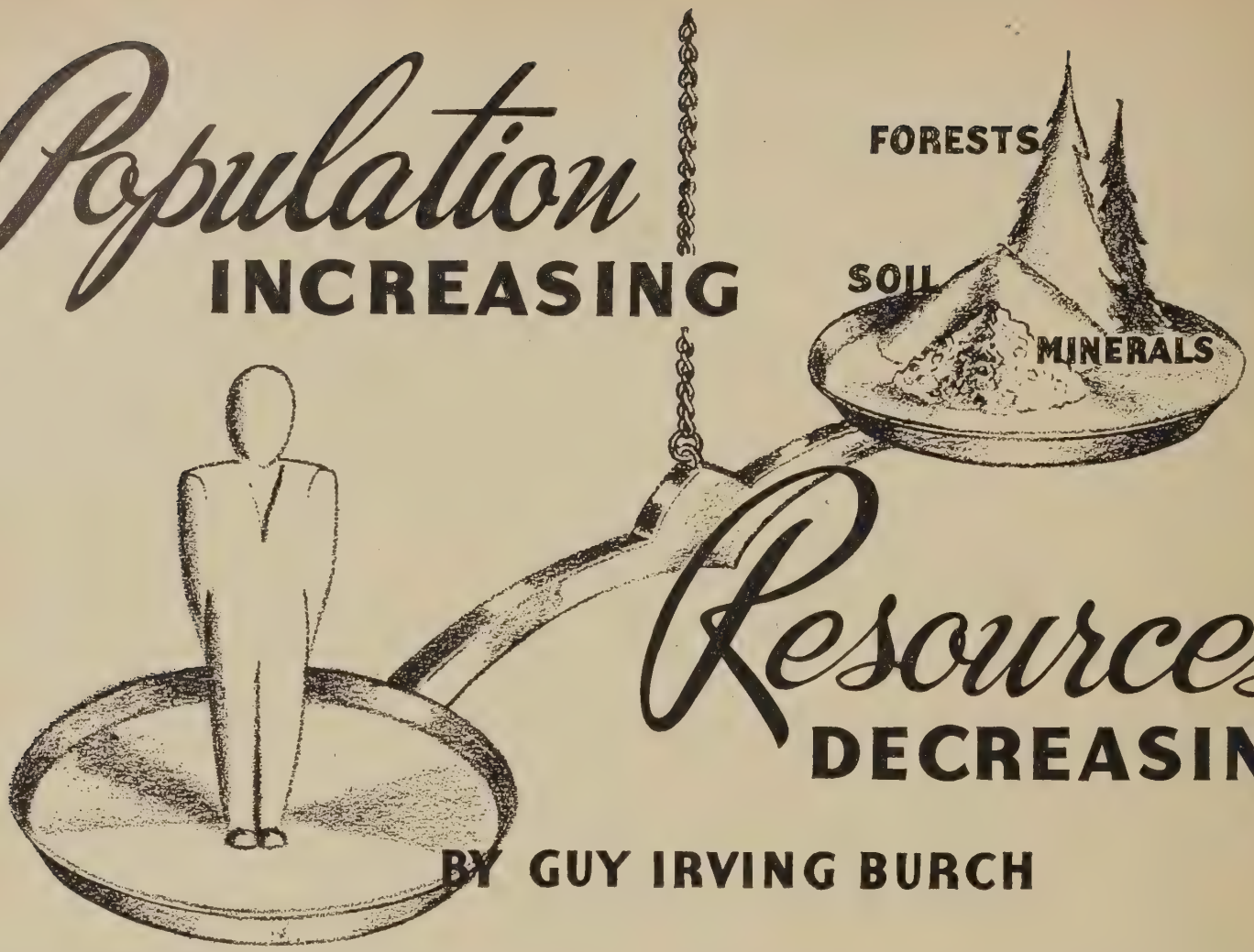
Population INCREASING



Resources DECREASING

BY GUY IRVING BURCH

FOR THE United States to be able to continue to support for any considerable length of time its present population of 140,000,000 (or even a population of 100,000,000), it must have at least four things: (1) An adequate supply of top soil, (2) an adequate supply of minerals, (3) an adequate supply of timber or forests, (4) a high quality of people.

As far as I can find out from a long study of Government and private sources, the United States does not have sufficient quantity of the first three nor high enough quality of people. Furthermore, all of these resources are on the decrease—some of them alarmingly so—and we are recklessly wasting all four.

This is not a pretty picture. It means that the American level of living and American traditional institutions of freedom have a short life ahead of them. People now living may witness the fall of the American Republic. On the other hand, most sources I have consulted believe there is a hope of escaping these disastrous results if we will all work hard now (not tomorrow, but now) to conserve and strengthen these natural and human resources.

In this whole picture I believe the population factor is basic. We cannot conserve our top soil, our minerals, our forests, nor the quality of our people, with a policy of trying to support more and more people at any price. With such a policy we find it necessary to exploit recklessly our natural resources as we have done in the past. That we *have* done these things in the past, I could quote from any number of qualified authorities, as we have done in our book *Population Roads to Peace or War.*

Briefly, what I mean is this: "Population density and economic conditions," say Nichols and Chambers in the Department of Agriculture Yearbook, 1938 (p. 652) "will sometimes dictate land-use practices and produce situations where cultivation is necessary on severely eroded land that should normally be retired, or on slopes too steep for safe tillage."

This has actually happened over and over again in all countries of the world including the United States (which is going through its wealth

NOTE.—The author is director, Population Reference Bureau, Washington, D. C. His article is taken from a paper presented at the Fifth Annual Conference on Conservation, Nutrition and Human Health, Athens, Ohio.

of natural resources faster than any other country).

* * *

The United States has had a double drain upon its soil, minerals, forests, and the water and wildlife that go along with these natural resources. The first drain was the rapidly increasing American population itself. Some of this drain may have been necessary, although for all practical purposes our population did not have to increase as much or as fast as it did. P. K. Whelpton of the Scripps Foundation for Research in Population Problems has pointed out that a stationary population of 100,000,000 would have been better from an economic point of view than our present-sized population of 140,000,000, (*Journal of Heredity*, September 1939)

* * *

The elder statesman Mr. Bernard M. Baruch has suggested that we take stock of this whole situation. In a letter to Congressman Gore November 3, 1945, Mr. Baruch said in part: "We cannot go on depleting our soil and mineral resources as we have in the last 70 years without tragic results to our whole economy and national life. A study of our resources and modern scientific methods to replenish the must be undertaken quickly."

Briefly, the situation is this. The United States is already exploiting its natural resources at a dangerous rate as regards to the future of its present population of 140,000,000 (or even the future of a permanent population of 100,000,000).

* * *

I certainly will not take advantage of your good nature by reading you long quotations from the Interior's annual report or still more detailed studies about the outlook for our mineral resources. But permit me to quote just a sentence or two. After saying that the drain on our natural resources due to the war has been "staggering," the Secretary of the Interior says: "Only 9 of the major minerals remain in our known domestic reserves in great enough quantity of usable grade to last 100 years or more. Our known usable reserves of 22 essential minerals have dwindled to a 35-year supply or less. * * * it behooves us to learn the true meaning of our meager supply, which is not that we will be weak in a hundred years, but that we are relatively weak now" (p. v, vii).

I am tempted to quote further from this report and from other reports such as that by Elmer W. Pehrson, Chief, Economic and Statistics Branch, Bureau of Mines, "The Mineral Position of the United States and the Outlook for the Future," February 19, 1945. But I must leave the details to your imagination. True, we are "producing" great quantities of minerals (that is, we are digging them out of our land faster with our new machines), but says Mr. Pehrson "It follows that the faster we grow in industrial strength and military potency—a growth made possible largely through mineral ouput—the faster we liquidate the very basis of our power" (p. 1). Incidentally, our *new* techniques have not enabled us to keep pace with earlier rates of *discovering* new mineral reserves.

Much the same story may be told about our diminishing top soil and forests. No doubt many of you are familiar with the statements of Dr. Hugh H. Bennett, Chief, United States Soil Conservation Service. Dr. Bennett's testimony before the House of Representatives Labor Committee, February 24, 1939, also can make the cold chills run up your back. He *repeated* the statement that we do not have enough good land left in the United States, and added that we are losing every day as a result of erosion the equivalent of 200 40-acre farms.

In a more recent work, "Our American Land," 1946, Dr. Bennett writes: "*So we have no more land to lose.* Actually we need more good land for crops now. Too many farmers are working poor land that should be turned back to grass or woodland. *More waste of good land would amount to a national crime* on the part of those who are responsible—meaning ourselves. Yet we are allowing 500,000 acres to go down to ruin each year" (p. 5).

In terms of tons, this means a loss from farm land alone of "about 3 billion tons of soil (enough to fill a train of freight cars girding the equator 18 times) are washed or blown away each year." In terms of money it means nearly 4 billion dollars annually. ("Soil Erosion in the United States," undated, United States Soil Conservation Service, p. 2).

There seems to be little doubt about it that our Soil Conservation Service can slow down this tremendous rate of soil loss to adequately support 100,000,000 Americans on a more or less per-

(*Continued on page 91*)

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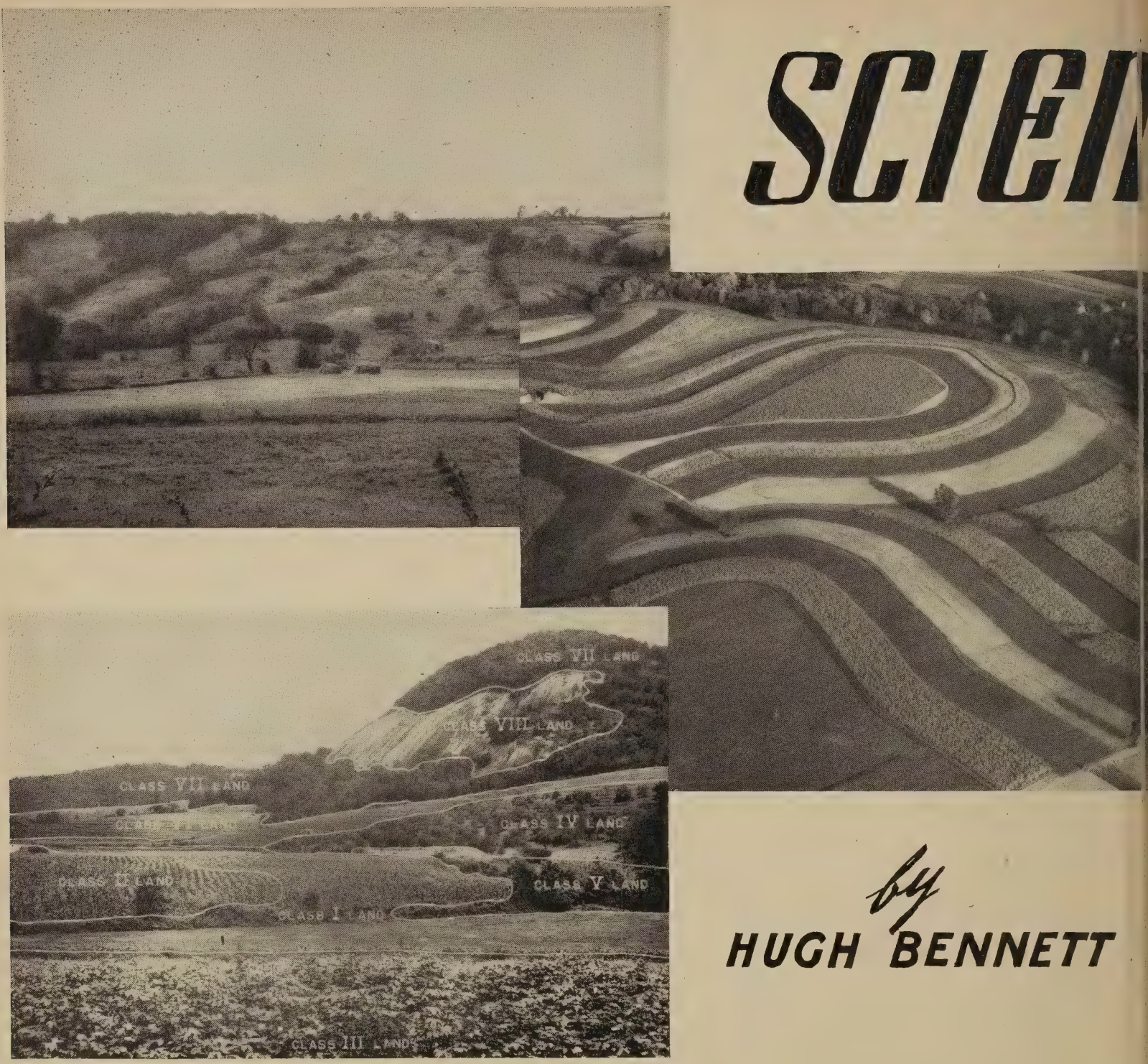


by
HUGH BENNETT

This photo illustrates the eight classes of land: Class I.—Very good land that can be cultivated safely with ordinary good farming methods. Class II.—Good land that can be cultivated safely with easily applied practices. Class III.—Moderately good land that can be cultivated safely with intensive treatment. Class IV.—Fairly good land, best suited to pasture and hay; can be cultivated occasionally. Class V.—Suitable for grazing or trees; needs only good management. Class VI.—Suitable for grazing or trees; needs protective measures. Class VII.—Suitable for grazing or trees; needs extreme care to prevent erosion and eliminate other hazards. Class VIII.—Suitable only for wildlife or recreation; usually steep, rough, stony, wet, or highly erodible. (Method developed by Soil Conservation Service.)

WHAT is Soil Conservation Science? Soil conservation science is primarily concerned with the determination of facts and principles fundamental to the permanently productive use of land. Such use calls first for essential protection of the land against removal of the soil by erosion, for conservation of rainfall, for removal of water where there is too much and its addition where there is too little. Various other supplementary or special measures and practices are applied toward this end, as called for by the physical facts and conditions involved with each situation.

Land PRACTICE of SOIL CONSERVATION

Gullying on steep, formerly cultivated field; Wooster and Lordstown soils. This is now class VII, no longer valuable for cultivation and not much use for anything.

Alternate contour strips—cultivated and close-growing crops. This method, developed by Soil Conservation Service, effectively controls erosion and reduces loss of rainfall as run-off on moderately sloping land. The width of the strips varies with steepness of slope and erodibility of the land. Class III land.

These basic facts and principles are determined through systematic research designed to provide for the advancement of the practice of soil conservation.

Soil Conservation Practice. Procedure in soil conservation is based on scientific principles arrived at through quantitative measurements of rates and processes of erosion and loss of rainfall under varied conditions of soil, slope, climate, and cropping practices. Soil conservation, therefore, is the scientific use of land in accordance with its physical aspects.

In order to put the scientific principles of soil conservation into practice, it is necessary for the conservation technician who prepares farm plans—and helps install them—to have a map of the farm which shows the precise location of the areas of the various kinds of land, appraised according to use capabilities.[1] For practical farm and ranch purposes, eight capability classes of land have been developed through processes of simplification of the physical characteristics of the land, as ascertained through conservation surveys. With such a blueprint of the farmland in his hand, the technician goes carefully over the entire farm, accompanied by the operator, and develops on the ground, in full cooperation with the farmer, a conservation plan for each distinctive important parcel of land comprising the farm tract.

Because of economic limitations of the farm operator, type of farming, inclination of the farmer, or location, it may sometimes be necessary to vary the recommended farming operations in some degree from the practices actually called for by the land conditions; but the guiding principle, nevertheless, is that the nearer the plan can come to meeting the requirements as determined by land conditions, the better the farm plan will be from the standpoint of stabilizing the land and keeping it productive while in use.

Areas are frequently found where such features as steepness of slope, thinness of soil, and marked susceptibility to destructive erosion (Land Capability Class IV) make it necessary, for best results, to limit the growing of cultivated crops to relatively short periods—usually not more than 1 year at a time for crops like corn, cotton, and tobacco. After such a brief period of cultivation, the field is turned back to a long rotation devoted to soil-holding, soil-building crops, such as grasses and legumes.

A national program of research is carried on continuously in support of sound soil conservation practice. New and better methods for checking wastage of soil and loss of rainfall as the result of improper use of land or lack of protection are constantly being sought. Answers to those farm problems that are continually coming up are sought through this research program. Land

[1] Many thousands of measurements have been made at the soil erosion experiment stations and elsewhere of soil and rainfall losses from important agricultural types of land throughout the country. A great variety of soils, slopes, crops, and cropping practices, and weather conditions were carefully considered, in the interpretations drawn from these measurements.

Two views of the same streambank area, lower Winooski River, Vt. At right, valuable bottomland being destroyed by erosion; at left, control achieved by brush matting. (Work by Soil Conservation Service.)

characteristics and conditions are so varied, in fact, that for a long time to come considerable research is likely to be necessary, at some points of the national program, in order to determine precisely what course to pursue. In other words, it is necessary to keep soil conservation practices at all times carefully adjusted to the requirements of the land, and research in this field therefore is one of the tools for getting the job done.

While it was known in the beginning that all pertinent facts relating to the many phases of the complicated procedures of sound agriculture had not been determined, we did have, in the early stages of the national program of soil conservation, the advantages of farmer experience to draw from. Then, as the program advanced, considerable additional information of a fundamental nature was gained through demonstrational operations. Moreover, the Service followed the policy of studying carefully the causes of any important failures of control methods, and structures; and out of these studies new and helpful information was sometimes obtained.

Soil Conservation a Scientific Job. Soil conservation science had its beginning, as I see it, back in 1905, when W. E. McLendon and I learned while making a soil survey of Louisa County, Va., that sheet arosion was gradually planing off the topsoil of unprotected sloping fields—the removal by run-off of rainfall of a layer of soil more or less evenly from whole fields. We found that in the course of several decades, depending on the kind of land and its use, the entire topsoil often was being removed, a thin layer at a time, in the muddied run-off of rainfall, down to entirely different material, subsoil. We soon came to understand that this process, generally unnoticed, was steadily changing countless fields, originally the same, from one kind of land to an entirely different kind—from mellow loam, for example, to stubborn clay (erosion-exposed subsoil).

Then, in the soil survey of Fairfield County, S. C.,[2] in 1911, 90,000 acres of formerly cultivated good land were mapped as rough gullied land, so cut to pieces by erosion as no longer to be suitable for cropping, and an additional 46,000 acres of stream alluvium, formerly cultivated and highly productive, was mapped as meadow, or essentially worthless swamp, as the result of the more frequent overflows, caused by filling of the stream channels with the products of erosion.

In this survey, we have one of the earliest quantitative measurements, by area, of what uncontrolled soil erosion does to productive land. A number of other early soil surveys in various parts of the country similarly gave some quantitative appraisal of erosion damage.

Thus we began the measurement of what erosion does to the land—and people.

In some of the Southern States, with much land devoted continuously to cotton production, some farmers were practically forced into the use of "hillside ditches," laid off by instruments, for slowing down run-off. Here was the first stage in the development of the American field terrace.

[2] Soil Survey, Fairfield County, S. C., Field Operations, Bureau of Soils, U. S. Department of Agriculture, 1911.

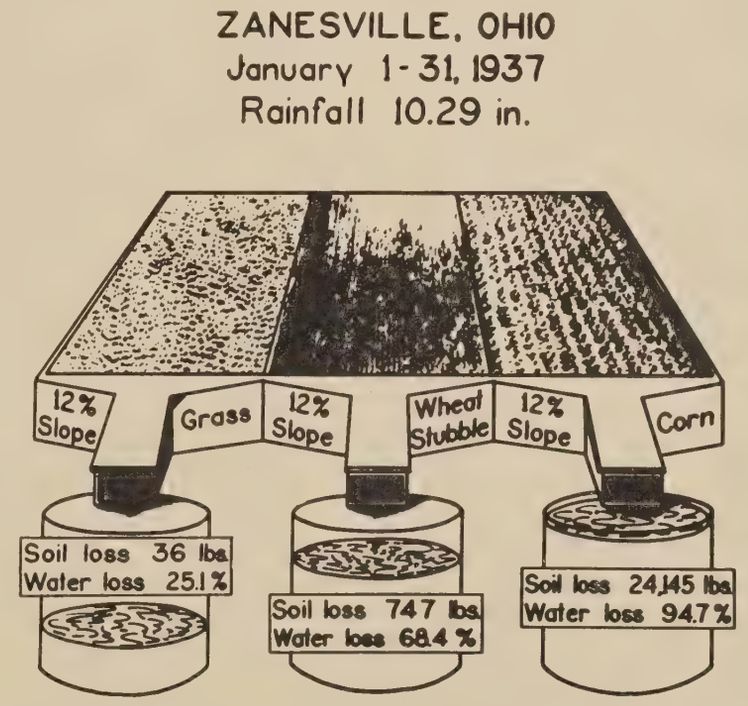
This device for soil conservation was used as far back as the 1830's in South Carolina. But agricultural specialists of those times, and a hundred years afterward, failed to subject this method of erosion control to the scrutiny of research. Even a half century later, when Priestly Mangum successfully used his Mangum terrace on his gently rolling farmland near Wake Forest, N. C., no one thought to subject this important structure for slowing down run-off and erosion to any kind of quantitative measurement with respect to its effectiveness. Here and there an occasional farmer would build dams in gullies to stop their growth, but even these were not investigated, although they frequently were built in such a way as to do more damage than good. An occasional farmer would throw cornstalks over his "field washes," but the practice as carried out, had very little beneficial effect.

Actually, what we were doing in the United States, generally speaking, with respect to use of the land was to go ahead cultivating fields in whatever way the farmer, without the benefit of science, deemed satisfactory. There was little or no thought of the evil consequences resulting from too rapid run-off of rainfall, accompanied by too rapid removal of topsoil, too much gullying, too much bankrupt farming, etc. What little was being done toward conservation was pretty much guesswork. No one even undertook to determine at what degree of slope, on definite types of land, cultivation of clean-tilled crops should cease and the land be devoted to such protective cover as grass or trees.

Then, finally—and most fortunately—came the soil erosion experiment stations, made possible by the Buchanan amendment to the agricultural appropriation bill for the fiscal year 1930. Some work had been done in the measurement of rates of soil and water losses from a few soil types by the Missouri, North Carolina, and Texas agricultural experiment stations some years prior to the establishment of these much more comprehensive soil erosion experiment stations, on representative types of land in various parts of the country.

Through the work of these stations, I think we can properly say, we moved definitely to break away from ignorance with respect to the ills of erosion, and the necessity for curing them. And so, we made, as noted, many thousands of measurements of soil and water losses by erosion and run-off, under a great many different conditions of slope, soil, climate, and cropping and tillage practices. Terraces, of different types and gradients, were studied on a variety of slopes and soils with respect to their effectiveness and durability. Previously, terraces were frequently built on gradients ranging up to a fall of as much as 30 inches or more in a linear distance of 100 feet. It was on these erosion experiment stations that we learned in the early 1930's, through systematic quantitative measurements, that a field terrace used for clean-tilled crops on the principal types of farmland in the United States seldom should exceed a fall of 6 inches in 100 feet, and generally should not exceed a fall of 3 inches.

Previous to these investigations, many farmers thought that when their lands were terraced, all had been done that needed to be done to stop erosion. On the experiment stations it was learned that on many kinds of land the losses of soil taking place on ordinary terrace intervals amounted to as much as 30, 60, 70, or nearly 90 tons of soil per acre annually, with accompanying losses of rainfall ranging up to 42 percent of the total precipitation. These losses meant that, although the land was terraced, the whole topsoil or a 7-inch surface layer would be lost in something like 10 to 50 years, depending on the land, conditions of land use, and rainfall. This, of course, meant that much more than terracing would be needed to



There's always a scientific basis for soil conservation techniques. Results of a research study at Zanesville, Ohio, depicted above are among many thousand measurements of run-off and soil losses under varying conditions and localities.

control erosion in any effective manner on these lands than the use of just one conservation measure.[3]

Before these measurements of erosion rates were made, very few people recognized any difference between normal or geological erosion and man-induced or accelerated erosion. When the facts were brought out, it was shown that normal erosion taking place under the protective cover of forest or grass was so slow that soil was built from beneath as fast as it was removed from the surface. In contrast, it was shown that under clean tillage on the same kinds of land, receiving the same rainfall, soil was lost at rates often more than a thousand times faster than under normal erosion—that is to say, at highly destructive rates.

For example, the figures referred to above show that the annual soil loss per acre from Clinton silt loam at the LaCrosse, Wis., soil erosion experiment station, under clean tillage, was approximately 80 tons per acre, annually, whereas under a cover of bluegrass on the same kind of land, with the same rainfall, soil loss for the corresponding period was only 0.03 ton per acre. Thus, clearing and cultivation had speeded up erosion on this land more than 2,600 times and had decreased the life expectancy of the productivity of the land from around 30,000 years to about 11 years.

Prior to the advent of this kind of scientific knowledge, developed at the erosion experiment stations, not much in the way of quantitative facts was known with respect to accelerated run-off from protected and unprotected farmlands and how this run-off affected flood conditions. An example of how run-off varies may be cited from results measured on the Zanesville, Ohio, erosion experiment station. In 1937, just before the big Ohio River flood, 11 inches of rain fell on the station during January. The measured loss of water as immediate run-off from a gullied cornfield amounted to 95 percent of the total rainfall, while only 32 percent ran off woodland of essentially the same slope, and 26 percent from the same kind of land covered with bluegrass. During this period 95 tons of soil per acre were lost from the gullied cornfield, but only 0.02 ton per acre from the bluegrass area (or one-four thousand seven hundred and fiftieth as much as from the cornfield).[4]

[3] See Soil Conservation, by H. H. Bennett, p. 129. McGraw-Hill Book Co., Inc., New York. 1939.

[4] Bennett, H. H. Adjustment of Agriculture to its Environment.

Now under the scientific procedure of measuring the effects of soil erosion and soil conservation, we are beginning to learn that soil conservation practices are not more expensive or time-consuming, as some have asserted, but rather they are less expensive and less time-consuming than the old wasteful ways of farming. That is to say, it is easier and cheaper to farm right than it is to farm wrong, and you save your land in the meantime.

It was found, for example, in plowing wheat stubble with a tractor-drawn disk plow, at Hays, Kans., that 22.4 percent more fuel was consumed in going up and down the slope than doing the same work on the contour, on the same type of land, and it took 9.8 percent less time operating on the contour than it did plowing up-and-down hill.[5]

Conservationist's Definition of Land. Land is not synonymous with soil in the science and practice of soil conservation. Soil is a part of land—a very important part. It is something that can be sampled and analyzed in a laboratory to determine its chemical composition; it can be scrutinized in the field with sufficient accuracy to determine certain outstanding textural and structural characteristics. But land to the conservationist is more than soil. It is soil that occupies definite slopes, such as cannot be sampled, but which, nevertheless, can be exactly determined with a level. And, since soil is generally subject to marked changes and deterioration by erosion, it is necessary to consider the effects of erosion, or the erosion hazard, as a part of the definition of land. These characteristics, moreover, vary greatly with the climate, frequently within short distances. Thus, to the conservationist, soil, slope, degree of erosion (or the erosion hazard), and climate, together constitute land.

Variations in land are numerous, but they are all duly considered in modern soil conservation practice.

Tools of Conservation. Since soil conservation is the proper use and care of land, so that it will produce maximum yields conforming with adequate protection, all measures that help keep land in condition favorable to sustained good production are the tools of conservation. Terracing, contouring, closing of gullies; maintenance of organic matter; appropriate use of grass, legumes, shrubs, trees, crop rotations, fertilizer; drainage where the land is too wet, and irrigation where it

[5] Barger, E. L. Power, Fuel, and Time Requirements of Contour Farming. Agr. Engineering, April 1938, p. 155.

is too dry—all of these and whatever else is needed to keep the land permanently in place and always productive are conservation tools necessary to getting the job of soil conservation effectively performed. These tools are used singly where the land is easy to stabilize, and in combination, one supplementing another, where the conservation needs are more complex. In other words, soil conservation includes any and all measures that will in any way help increase the productivity of the land and make it keep on producing satisfactory yields.

Scientific Treating of Land. If there were some standardized, simple method for stabilizing land or some remedy for its ills that could be applied indiscriminately, the job of soil conservation would be comparatively easy. But there is about as much variety in the land and in the performance of water, wind, temperature, and plants, as in the highly complicated landscape of the country. Control methods that work wonders in the cotton country may do more harm than good on the wheatlands of the Great Plains. And many of those that are quite practical on the high-yielding corn lands of the Midwest may not be appropriate for the dairy and vegetable lands of the Northeast. Even on neighboring farms, and often in the same field, land problems are almost never completely identical. And in those localities where much of the precipitation is in the form of snow, special measures are required to safeguard farm and range land. In short, the soil and water conservation program must be sufficiently flexible to meet all the possible conditions and needs.

The specific land treatments used and recommended by Soil Conservation Service technicians may, therefore, vary from one valley to the next, from farm to farm, and even from field to field. Before any work is done, each farm or ranch is carefully analyzed, both as a piece of land and as a business enterprise.

In making a physical analysis to determine productivity, needs, etc., field men of the Service carefully note, on the ground, the exact lay of the land, the quality of the soil, the degree of erosion damage, and the prevailing erosion hazards on every acre of every field, woodlot, and pasture over the entire farm. As accurately as possible, these conservation technicians determine which lands can be cultivated under good farm practices without excessive loss of soil and rainfall, and at reasonable cost in labor and materials; which lands need the protection afforded by special crop arrangements and special tillage practices or structural installations; and which ones require a permanent cover of trees, grass, or other protective vegetation. In those localities where irrigation is practiced, specialists are even sent every year into the snow-bearing mountains of the upper watersheds to determine how much water the farmers in the valley below may count on for seasonal plantings when the deposits of snow melt.

The Conservation Technician Works with the Farmer in His Fields, Pastures, and Woodlots. The next step is to work out with the farmer a farm plan for practical operation, based, as pointed out above, on-the-ground information acquired and translated into eight simple land-capability classes.[6] *This job of developing the farm plan* as already noted, *the soil conservation technician does, not indoors around a table, but out in the fields, pastures, woodlots, gullies, and abandoned and idle areas, working along with the farmer himself—with all the pertinent facts immediately at hand for full and understanding consideration.*

In some cases, the new farm arrangement, based on the physical aspect and needs of the land, may not entirely fit the farmer's economic situation. It may call for more hay crops than he actually needs or can sell and not enough potatoes or corn or wheat; it may propose other changes the farmer cannot afford to make. If so, it is not a good arrangement in a practical sense, and however scientific it may be, it must be adjusted, of possible, to meet family needs, market opportunities, and the farmer's personal preferences. Purely from the conservation standpoint, however, the farm arrangement based on physical land analysis is ideal. As already pointed out, the closer the farmer can approach it and still make a good living, the more stable and productive his land will be, and the surer his income, over the long run.

After Making the Farm Plan, Comes the Job of Application to the Land. Drawing up a satisfactory land-use and land-protection plan for a farm is only half the job—or less. The other half involves the actual application of the plan to the land.

Each parcel of land generally needs some special practice or treatment for adequate protection and efficient, maximum production. Taking these into account, the farm plan is made with enough flexi-

[6] See lower photograph page 84.

bility to allow a choice of crops to be grown and methods to be used. Steep or unproductive croplands, for example, may be earmarked for a permanent cover of grass or legumes, or trees; farm woods may be planned where grass is not paying out or is failing to hold the soil, and vice versa; gullied areas may be turned into grass-covered waterways, farm sanctuaries for animals and birds, or valuable pastures of kudzu.

Croplands generally should be farmed in rotation, as nearly on the level as may be practicable, and sometimes in strips. On the more erodible slopes, terraces or diversion ditches are frequently needed for added protection. Pastures often need to be contour-furrowed, limed, fertilized, cleared of weeds before the seeds mature, and grazed with caution to improve the growth of grass. Woodlands need to be fenced to keep out livestock, and they need to be protected from fire and managed according to scientific principles of forestry. These are only a few of the dozens of erosion-control practices that may be called into use to fit particular situations.

Here we have the scientific practice of soil conservation, arrived at out of the science of soil conservation.

Save the SOIL and Save TEXAS

By Walter R. Humphrey

EDITOR, FORT WORTH PRESS

THE JOB of saving America's soil is everybody's job.

It is everybody's business, and the Fort Worth Press is undertaking to make it just that through its recently instituted Save the Soil and Save Texas campaign.

The press has gone beyond its normal program of telling the public about soil conservation, its needs and accomplishments, and has set out to reward those who distinguish themselves in the battle against erosion.

This newspaper's campaign is designed to recognize with suitable awards those who have made notable achievements during the year in soil conservation work.

This year, 1946, saw the first awards presented. The occasion was a soil conservation dinner in Fort Worth last June.

Organizations assisting in the sponsorship of the campaign presented $3,000 in cash awards for the following achievements:

One thousand dollars to the soil conservation district in north and northwest Texas with the greatest percentage of its work agreements completed; $1,000 to the soil conservation group (or community) on the same basis; $500 to the man making the greatest unselfish contribution to soil conservation; $500 to boys and girls in an essay contest on the subject, What Soil Conservation Means to My Community.

In addition, the Fort Worth Lions Club presented a plaque to the outstanding farmer in each of the 13 competing districts, and the Press gave certificates to all farmers who had completed their soil conservation programs and still had them in active operation.

Assistant Secretary of Agriculture Charles F. Brannan came down from Washington to do the honors.

The response to this first program was spontaneous and enthusiastic. There was but one natural result: its State-wide expansion.

In 1947, therefore, all Texas will be competing for, "Save the Soil" awards. The prize list will include $10,000 in cash, 135 plaques, certificates and other recognitions.

As in the regional program this year, the 1947 program will be carried on through the organized soil conservation districts—there are 130 of them in Texas today.

The set-up for the "Save the Soil and Save Texas" campaign was worked out initially in cooperation with the Texas State Soil Conservation Board, the Soil Conservation Service.

The supervisors became the key to the program from the start and will continue in their key position as the program becomes an annual Texas-wide affair. Records maintained by the supervisors are the basis for making awards. The supervisors met in advance of the first program and established their own score card. Judging then became simply a matter of checking. This procedure will be followed again in 1947. The State Association of Soil Conservation District Supervisors will be the rule-making body. It is the work of supervisors and cooperating farmers throughout Texas that the Press seeks to recognize.

Since districts are set up under State law, the entire operation of the plan has a State tie-in, rather than Federal.

However, the advice and technical assistance of Soil Conservation Service personnel has been fundamental. Bill Durham, regional editor of the Fort Worth Press, who directed the first program, will be in charge in 1947. As an ardent conservationist who has followed the conservation program in Texas closely since the establishment of the first experiment stations, the initiation of the Elm Creek project by the old Soil Erosion Service east of Temple, Tex., and the long fight for the passage of a State soil districts law, I feel that this program of recognition ought to get somewhere in popularizing the great work done by conservation pioneers.

Many agencies have offered their cooperation. The Brazos River Conservation and Reclamation District will present $1,000 in awards for achievements in the 44,600-square mile Brazos watershed. The Trinity Improvement Association, which cooperated in the first awards dinner, will participate in some manner in 1947. Sponsors who have put up the money for cash awards have given from $500 to $1,000 and have been enthusiastic participators in the plan for recognizing achievements.

Although the Fort Worth Press does not have a State-wide circulation, it has felt that it has very properly taken the lead in setting up a continuing program in which all the State can take part.

There are no selfish motives behind the campaign, other than to make a contribution to the development and growth of Texas.

Tentatively, the 1947 Awards Dinner will be held on the anniversary of the first—June 1.

Secretary of Agriculture Clinton P. Anderson, who originally had intended being on hand for the first awards-giving, has asked that he be invited again. And he most certainly will be.

Thanks to the cooperation and enthusiastic assistance of men who are devoting their lives and careers to soil conservation work, the Save the Soil and Save Texas program is off to a remarkable start.

We would like to make heroes out of men who have done an outstanding job in saving the soil in their communities.

We think they deserve that kind of recognition—the acclaim of a grateful State, and substantial cash!

They are some of the great people of this day.

Population and Resources

(*Continued from page 83*)

manent basis at a high level of living if land-use practices are dictated by soil science and *not* dictated by population density and an ever-increasing population. Our population already numbers 140,000,000. It has increased 40,000,000 or 40 percent during the past 35 years (which included two world wars and a serious economic depression). With all due respect to recent forecasts that our population will cease to increase after it increases 30 or 40 more millions, no one can be certain that it will stop increasing short of 200,000,000, or even more.

It certainly would be an uncomfortable position in which to find ourselves half a century or a century hence with 200,000,000 people in this country but with scarcely enough mineral resources and top soil to adequately support half this large number on a permanent basis.

True, the United States during the war emergency produced one-third more food than it did before the war. We also made spectacular increases in food production during World War I, but we must not forget the dust storms of the early 1930's. Thanks to the Soil Conservation Service we have been wiser during this war, and thanks also to favorable weather while many other parts of the world were suffering severe droughts. We should also remember Dr. Bennett's statements that "actually we need more good land for crops now," and "Too many farmers are working poor land that should be turned back to grass or woodland."

NICHOLS RECOGNIZED BY WAR DEPARTMENT

"For outstanding assistance to the Ordnance Department through the advancement of the program of studying the physical characteristics of soil and applying the data obtained to the design of vehicles" during the war, a certificate of appreciation has been awarded Dr. Mark L. Nichols by the War Department. The Department expressed "its appreciation for patriotic service in a position of trust and responsibility" to the man who heads research work of the Soil Conservation Service.

FARM DOUBLES VALUE IN 6 yrs.

by EARL SMITH

Sale of Belgians nets Jones a tidy profit.

THREE successive years of poor crop yields and low income prior to 1939 convinced Walker Jones, Wagoner, Okla., that there must be some more profitable use for his 440-acre farm than cultivation. The land had cost him only $15 per acre, but Jones knew he was losing money when his run-down land averaged 10 bushels of corn and 8 bushels of wheat per acre.

Having considerable experience with livestock, Jones decided to see what he could do with cattle. With that in mind, he applied to the Verdi-Grand soil conservation district for assistance in planning a livestock program.

Two technicians of the Soil Conservation Service walked over the entire farm with Jones. Together, the three agreed that all cultivated land except 95 fertile acres along a small creek could profitably be devoted to pasture. Forty-five acres were set aside for homestead, barn, roads, creeks, farm ponds, and post plantings.

With the changes in land use decided on, the technicians and Walker sat down and worked out a detailed plan of conservation operations.

Following the plan during the past 6 years, Jones has overseeded his 300 acres of pasture land with Korean lespedeza, yellow hop clover, white

Still another source of income—Jacks.

NOTE.—The author is work unit conservationist, Soil Conservation Service, Wagoner, Okla.

One of the two ponds which provide water for livestock plus good fishing. The black locusts on the other side produce fence posts and cover for wildlife.

These sheep can't begin to eat down the tall grass in Jones' Bermuda pasture. Here they're clustered on a diversion terrace.

clover, and ryegrass. Some native bluestems grass was present when he began the pasture development. He has spread an average of 100 tons of barnyard manure on the pasture land each of the past 3 years. More than 300 tons of agricultural limestone and 16 tons of superphosphate also have been put on the grasses.

The conservation measures now installed include diversions to keep water from rushing over areas likely to wash and gully easily, terraces, terrace outlets, contour cultivation, contour sodding, postlot planting, and two farm ponds. Jones follows a regular system of rotation grazing to allow his pasture grasses to attain maximum usefulness.

Twice a year, in June and August, the pasture is mowed to control weeds. Jones estimates that it will carry one head of livestock per acre for at least 8 months each year.

Barnyard manure has been applied on the 95 acres of cropland in about the same proportion as on pasture. Also, a soil-improving legume is regularly used in the crop rotation. Now, where cotton made 150 pounds of lint per acre before 1939, Jones gets a bale to the acre. His wheat produces 15 bushels per acre, instead of 8 bushels as formerly, and his corn has jumped from 10 bushels prior to 1939 to 30 bushels now.

When he began conservation farming Jones had 40 grade Hereford cows, 30 calves and 7 horses. He has sold most of the grade stock and replaced them with registered Herefords. His herd now numbers 103 cattle. Other stock includes registered Belgian mares, stallions, jacks and jennies, several quarter-horses, a flock of bronze turkeys, 100 high grade sheep, and several registered rams.

In 1944 Jones' income from sales was $7,091, while his expenses, chiefly for protein feeds, were

One result of farming in cooperation with the Verdi-Grand soil conservation district. Attractive home and grounds, and a family situated to enjoy them.

$3,864. That left him a net income from sales of $3,226—on land that cost $15 per acre. Jones believes his 6 years of conservation farming have doubled the value of his farm.

NIGHT CLASSES FOR GOVERNMENT WORKERS

Courses now being offered by the Graduate School of the United States Department of Agriculture reflect the desire of the Department to keep its young scientists and technicians informed and "growing in their work." They also offer an opportunity for specialists to broaden their fields of interest by studying related subjects. The faculty is recruited from neighboring institutions of learning and from among recognized authorities in the Government.

Teachers drawn from the Soil Conservation Service include A. E. Brandt, Verna C. Mohagen, J. Gordon Steele, John H. Wetzel, Mark L. Nichols, and John G. Sutton.

FARM FISH PONDS IN SOUTH AFRICA

Modern production of fish for food from farm ponds is being encouraged in other lands. Charles R. Enlow, now agricultural attaché to the Union of South Africa, sends us a clipping from a local newspaper. It quotes Dr. Hey, South African fisheries expert, who says:

> The potentialities of inland fisheries in Rhodesia may be roughly grouped under three headings, first and foremost of which would be fish farming. . . . The object of fish farming is to utilize the farm dam as an additional land from which a food crop can be produced. It is possible for any farmer, or native village for that matter, to grow fish in the same way as one would grow an agricultural crop or rear farm animals.

Dr. Hey then goes on to describe fish-rearing methods similar to those recommended by Soil Conservation Service technicians, including the fertilizing of pond waters. He also calls attention to the need for utilizing existing river systems for native fish and the development of fishing as a recreational resource in South Africa. He sees the close relation between fisheries and soil conservation, and states:

> A resource may also be destroyed by man's interfernce with the habitat. Erosion in the catchment areas silts up rivers, industries discharge their waste into rivers and even large dams may check spawning runs. Conservation, therefore, is the concern of every man, woman and child of every nation. Our very existence upon this planet depends upon the conservation of two basic resources—soil and water.

REVIEWS

GRASSES AND CULTURAL METHODS FOR RESEEDING Abandoned Farm Lands in Southern Idaho, R. H. Stark, J. L. Toevs, and A. L. Hafenrichter. (Coop. U. S. D. A. and Idaho Experiment Station.) Idaho Station Bulletin 267. 36 pages, 10 illustrations. 1946.

The widespread "plow up" of native grass and range lands for wheat production during World War I resulted in soil depletion, serious wind and water erosion and land abandonment throughout dryland farming areas.

The restoration of these lands in keeping with their potential use value for permanent agriculture has been a major conservation achievement of the last three decades.

World War II, with its enormous demands for human food has caused a repetition in large measure of the "plow up" that was so costly and disastrous a generation ago.

This bulletin is so timely and complete with research information about adapted grasses, methods of establishment and conservation practices suited to the restoration of abandoned dry farm lands that the usual policy of the Service magazine has been extended to include this technical review.

Methods for converting eroded abandoned wheatlands to dryland pasture by reseeding in keeping with proper land use are reported. Comparison of six grasses and eight mixtures, each containing two grasses, are given for stands of different age. Cultural practices included four methods of seedbed preparation, four types of drills and three dates of seeding. Total production, calculated grazing capacity and basal densities from planted grasses and from volunteering cheatgrass are given.

Summer fallowing was the best seedbed preparation. Summer fallowing extended planting dates, made possible the use of several new grasses, and advanced the development of the stands to full production. On summer fallow, fall and early spring seedings of crested wheatgrass (*Agropyron cristatum*) and bluebunch wheatgrass (*A. spicatum*) were successful in all years. Late spring seeding was successful 2 years in 3. Satisfactory seedbeds for fall plantings were also obtained by burning cheatgrass in late spring and by duck-footing the land just prior to seeding, except when fall rains were below normal. Seeding directly into cheatgrass in the fall resulted in poor stands and retarded development by at least 1 year.

There were no significant differences in stand or yield due to the use of different types of drills, except where plantings were made without seed-bed preparation. In this case the deep-furrow and the double-disk drills were best.

Wheatgrasses, both exotic and native, and native bluegrasses were best adapted to conditions of abandoned land and low rainfall. When stands of the bunch wheatgrasses, *A. spicatum*, *A. cristatum*, *A. elongatum*, and of the sod-grasses, *A. smithii* and *A. dasystachyum* had reached full development, there were no significant differences in production. *A. cristatum* reached full development 1 year sooner than the other wheatgrasses. The 3 bunch wheatgrasses have different seasons of use. *A. elongatum* was the latest of all, and extended the grazing season as much as 30 days into the rainless summer months after the other grasses were dry and fibrous. *A. spicatum* was 2 weeks later than *A. cristatum*. The season of use for *A. smithii* corresponded to that of *A. spicatum* and that for *A. dasystachyum* to *A. cristatum*. By seeding separate pastures to grasses with different season of use, the grazing season was extended by 4 to 6 weeks.

Alternate-row mixture seedings of bunchgrasses and of bunch and sodgrasses gave no significant differences in production or grazing capacity from pure-stand seedings. Bunchgrass determined the yield when mixtures of bunch and sodgrasses were used. Bunch wheatgrasses determined yield when seeded with big bluegrass (*Poa ampla*). A dwarf sodgrass (*A. riparium*) was adapted to the low rainfall conditions (8.89 inches) and provided excellent ground cover between bunchgrasses, but its production was low.

Alternate-row seedings of Michels' rye and crested and bluebunch wheatgrass allowed full establishment of the grass, produced more than a ton of rye hay the year after seeding, but the rye retarded the full development of the grass stands by 1 year.

The basal density of planted grasses was correlated with yield. The basal density of volunteer cheatgrass was correlated with its yield. The basal density of planted grass was negatively correlated with the basal density of the cheatgrass. All coefficients were highly significant. Fully developed stands of planted grasses had an average basal density of 2.67 percent and produced 1,173 pounds of air-dry forage per acre. The average basal density of cheatgrass (alone) was 2.64 percent with a yield of only 607 pounds.

Selected strains of all grasses except *A. cristatum* were used. They were chosen for their adaptation to the conditions commonly found on eroded abandoned wheatlands. New species adapted to this conservation use were *A. spicatum*, *A. elongatum*, *A. dasystachyum*, *A. riparium*, and *P. ampla*.

REFERENCE LIST

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Kathryn Fravell is getting experience working on her father's farm near Mount Vernon, Ohio, in case she should hop across the pond some time to operate a combine in England.

(See "Introducing InLaC" in this issue.)

U. S GOVERNMENT PRINTING OFFICE: 1946

DECEMBER 1946

SOIL CONSERVATION

OFFICIAL ORGAN OF THE SOIL CONSERVATION SERVICE

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SOIL CONSERVATION

CLINTON P. ANDERSON
SECRETARY OF AGRICULTURE

HUGH H. BENNETT
CHIEF, SOIL CONSERVATION SERVICE

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WELLINGTON BRINK, EDITOR

CONTENTS

Front Cover: Tim Kaufman explains how contour pasture furrows hold water and prevent soil erosion, at a regular 4–H Club meeting in county agent's office in Armour, S. Dak. Tim, an Armour farm boy, was 1945 Firestone 4–H Conservation Award winner. (Photograph by R. W. Hufnagle.)

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BOBWHITES *thrive on* BICOLOR

Three years' growth of bicolor mulches the soil, provides food and cover for bobwhites.

by VERNE E. DAVISON

SOIL conservation farming supports bobwhite quail better than either nature or man has been able to do before. Thousands of bobwhites are feeding in strips of bicolor lespedeza this winter. With the use of bicolor come some new ideas—new principles in land management for game.

There are thousands of landowners whose interest in conservation of their soil has not been stimulated by the promise of better tilled crops, better woods, or better pastures. Through their primary want—more quail—they nevertheless have a genuine interest in a full soil conservation program. Who are these people? They are doctors, lawyers, merchants, and other sportsmen who own land. They may or may not live upon the land or derive their living from it. Some are owners of large estates, large timber holdings, private hunting preserves. Some are owners of 100-acre farms, more numerous than the thousand-acre tracts.

"We're going to get some of the bicolor. That's the stuff we've been looking for," writes Al V. Smith, landowner-sportsman of Fayetteville, N. C.

NOTE.—The author is chief, regional biology division, Soil Conservation Service, Spartanburg, S. C.

"We own 2,500 acres of land in Cumberland County. Our quail hunting isn't good. We've restocked and tried everything we could plant but we still don't have many birds. Please send all the information you have on bicolor."

Another letter from A. A. Richardson, chief game warden of South Carolina, says, "I hunted one day and a half last week and found 29 coveys of quail—all very large coveys. About three-fourths of these coveys were in or near bicolor patches, and the craws of nearly all of the birds were full of bicolor. I believe there are more birds now on Belmont than there were when Belmont was at its best—and I consider bicolor chiefly responsible for the increase."

We cannot depend on nature to provide high yields of bobwhites any more than we can depend upon her alone to produce high yields of other crops of the land. Protection of native vegetation is not good enough for bobwhites. You won't have any more birds than ordinary if you leave it up to Mother Nature to select the plants for borders, hedges, and woodland. Many shrub and grass areas produce no winter foods—and very poor cover. Look at those with which you are familiar.

Down in the southern section of the quail country, the most successful quail management for many years has been poor, weedy farming. Thousands of acres of potentially good cropland are held as game lands. Thousands of acres of poor land support too few quail to hunt. The Soil Conservation Service could subscribe neither to land in poor condition, nor to people made poor by wasteful management of good land.

During the war many plantations lost tenants. Oddly enough the bobwhites became scarce too. The owners had no substitute for patchy, weedy farming. Also, many owners shifted their idle land to forestry and quail became less abundant because their native foods were choked out as the trees came in. The owners did not want to lose their coveys of quail but no suitable practice was available by which to feed the birds in the new woodland. Two things were lacking: A concept of wildlife land well managed for a specific kind of game, and a perennial plant that could be used economically.

Thus, bicolor was developed as an agricultural practice. It was first used successfully on woodland-field borders where wildlife land is the only sound use. Then we took it into the woods and across idle land in one-eighth-acre strips on which we produce 25 to 50 pounds of seed every year. New, but promising, are 5-row hedges across cropland, placed between the different crops of a rotation in strip-crop designs. Most conservationists considered bicolor a poor gamble in 1937. Quail were then known to have eaten 400 kinds of food. Could bicolor be better than those? 400 to 1!

Quail begin to feed on bicolor seed in late October, use it regularly every day, returning for its daily sustenance until insects are in dependable supply the next spring. It has stood tests of preference against every recognized food in the field. It is more dependable than any other. Its range of soil adaptability, though not completely known, appears to be wider than any other single quail-food plant. Being a perennial, it is more economical than annuals, for once established it is not expensive to manage.

Bicolor needs no defense against the criticism of those who advocate "variety" in their diet. It occupies only 1 to 3 percent of the land—thus the birds have the insects, waste grain, weed seeds and fruits of the remaining 97 to 99 percent of the land.

Bicolor is worthy of a trial wherever quail exist. It has not been proven at the western and northern fringes of the bird's range. Indeed, scores of counties within bicolor's proven range do not have adequate trials of this new but useful plant for farms.

Experience in the Southeast shows that you cannot conscientiously recommend bicolor as a feature of soil conservation district programs until you have living proof of its value in the district where you work. This will take a year—and more. Let me give you a tried recipe:

You need landowners (preferably 3 or 4) who want quail and want to test bicolor. You won't have time to drive them, or do their work of preparing the land, fertilizing, planting, and cultivating. You will need to: (1) get them the plants and the seed, (2) select suitable sites, (3) give them written instructions, and (4) observe the results so you can advise them further.

You need 3,000 plants and 3 pounds of scarified seed for each owner. This will establish three strips which will feed the quail the first winter after planting. The same strips will produce twice as much seed the second year. From these planted strips you will learn: (1) how the plant appears in strips of 4 or 5 rows, (2) what growth to expect,

Bobwhite quail feeding in brush woods on the Adolf Solum farm, Spring Grove, Minn. The woodlot makes a good home for many species of wildlife.

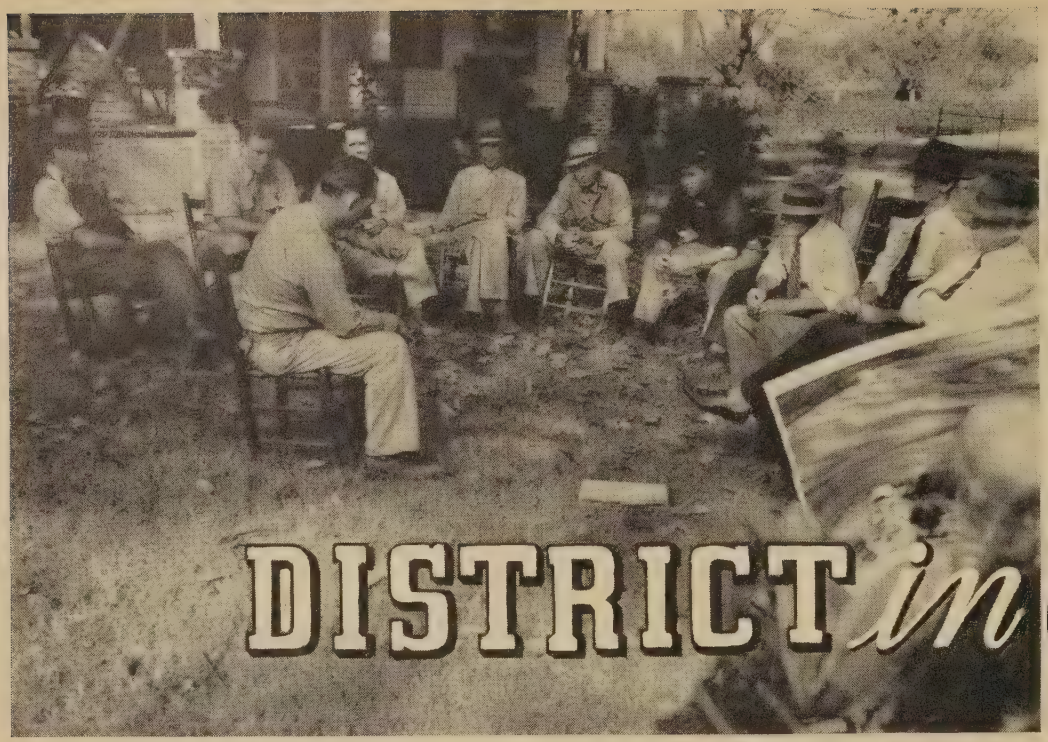
and (3) what use is made of the flowers by bees, the bark by rabbits, and the seed by quail. You should look for quail in the strips at evening in winter and take a bird to examine its craw for bicolor seed. This is the final proof of its use. Now don't worry about the false idea, prevalent in most game circles, that quail will take 2 or 3 years to "get used to a new food." They'll eat bicolor the first time they find it.

The three strips planted with seed will teach you: (1) how to get a stand by this method, (2) how to care for it, and (3) patience during the 2 or 3 years this cheaper method requires for maturity. You will find both plants and seeds can be used to get a stand—separately or together as the owner wishes.

You will want to make new plantings for at least 3 years in succession. Your first pattern may not be quite right—and patterns are very important! Borders need to be 4 or 5 rows wide (approximately 15 feet wide) and extend the full length of woods-field junction. Strips in the woods should be 4 or 5 rows wide, too, but need be only 400 feet long. Four or five strips to 100 acres of woods may be enough. Perhaps double this number may prove most economical. You may later want a bicolor hedge, but you should try the borders and interior strips first.

Your bird dogs will get the point on bicolor plantings. You need not take a bird census. The betterment is obvious to the hunter, for bicolor supports quail better than either nature or man has been able to do before. And this can be done as a part of soil conservation farming, especially appropriate where the land owner wishes to use his land to produce an increased crop of quail.

NOTE.—Mr. Davison's article, "For Farms and Game Preserves—Bicolor Lespedeza," in the August-September issue of Better Crops With Plant Food tells how to establish bicolor. A few reprints may be obtained from that magazine.



DISTRICT *in Action*

BY
R.Y. BAILEY

Supervisor Huff and several neighbors discuss with Work Unit Conservationist Granade plans for getting soil conservation practices applied.

MUCH has been said and written about the democratic nature of soil conservation districts. It is generally recognized that these districts are a practical expression of the will of the people with regard to soil and water conservation in a given district. Farmers in the district are expected to develop their own program and get whatever assistance they need from agricultural agencies, business groups and individuals in planning and carrying out their program.

The trouble is: It doesn't always work out that way, and that's why some people have had an honest doubt about the ability or the willingness of farmers to really make a soil conservation district work as an organization by and for farmers. Every once in a while you will come across a district where the farmers have been inclined to remain in the background and let the professional agricultural leaders do most of the talking and preside over most of the meetings. I wonder if in these cases the fault does not lie with us professionals who have not given farmers a real opportunity to plan and conduct any of their own programs?

My personal nomination for the ideal district meeting is the one I had the privilege of attending on the lawn in front of the farm home of District Supervisor S. B. Huff of the Greenville, S. C. County Soil Conservation District. Mr. Huff and several other farmers had invited about 100 of their neighbors and friends to a fish fry on the night of August 30 in conjunction with the annual meeting of the Fork Shoals Road Soil Conservation Club. The meeting was planned and conducted by the farmers in this fine rural community where there is as much soil conservation planned and applied on the land as can be found in any other community in the country.

Mr. Huff and other members of the club who were hosts at the party began in the right way by feeding their guests first. Fried catfish, "hushpuppies," pickles, and iced tea were served in great abundance. There may have been other items of food, but being a catfish and "hushpuppy" man, I didn't look for anything else. Incidentally, those who have not eaten genuine "hushpuppies," browned in the fat in which catfish is fried, have not lived a full life.

After the guests were so well filled that they did not want to move around for a while, they were assembled on comfortable seats that had been arranged on the lawn. A few short talks were made by guests who were called on by Mr. Huff who presided at this part of the meeting.

Mr. Huff called on several of the farmers in the neighborhood for brief statements about their activities in soil conservation on their own farms.

NOTE.—The author is chief, regional agronomy division, Soil Conservation Service, Spartanburg, S. C.

NOTE.—For the uninitiated it should perhaps be pointed out that a "hushpuppy" is a sort of corn-dodger supreme, and Mr. Bailey knows whereof he speaks.

One of these stood before his neighbors and confessed that he had not been in favor of some of the practices that were planned for the land, but that he had since seen the value of them. He said he was sorry for some of the things he had said against the program before he understood it.

Drayton Hopkins, local leader of the Fork Shoals Road Soil Conservation Club and one of the hosts at the party, was called on for an announcement about a tour that was being planned to study research work with stubble-mulch farming at Clemson College. Cooperative research by the Soil Conservation Service Research Division and Clemson College in which corn is being grown under a system of stubble mulching has attracted considerable attention and these soil conservation farmers were going over to make a first-hand study of it. Mr. Hopkins also announced another business meeting of the club to be held within the next few days.

One of many groups of visitors to the Fork Shoals Road community. They're looking at an excellent crop of lespedeza in one of Mr. Huff's rotations.

The high light of the entire affair was the showing of a set of lantern slides that Mr. Huff and his son had made while his son was at home on vacation during the summer. These slides showed soil conservation practices on several farms in the community. The slides were excellent, but the most interesting feature was the fact that Mr. Huff stood at the screen with a pointer and explained each slide. He told where each one was made and frequently called on the owner of the farm for comment. This was interesting to me because it would have been a most natural thing for Mr. Huff to have called on the county agent or the work unit conservationist—both of whom were present—to explain the slides to the group.

It was while the lantern slides were being shown that Clifford Smith, a supervisor from a neighboring district, made the statement that this was what he called a soil conservation district in action. Thus the title of this account of the meeting was borrowed from a farmer.

It seems appropriate at this time to say that the Fork Shoals Road Soil Conservation Club is an

(Continued on page 111)

Rotations are arranged in contour strips on the Hopkins farm. Lespedeza was seeded on the grain shown here.

Drainage IN THE RED RIVER VALLEY

by A.D. McKINNON

At left.—A farm drain being built. Lack of farm drains to carry water off the land to the main drains was primarily responsible for the disappointing results of earlier drainage work in the area.

At right—One of the completed drains. Note the two large outlets in foreground, which carry water beneath the road. Note also slope of banks, designed to make maintenance easier.

CHEWING away with draglines, carry-all scrapers, and smaller equipment, farmers in soil conservation districts in the Red River Valley of North Dakota last year took a 1,716,000-cubic-yard bite out of the tremendous drainage job that needs to be done there to protect crops from loss by flooding.

That amount of earth, if spread over a 160-acre farm, would make a layer 6⅔ feet deep. It is more than three times as much as was moved in 1944, the first year of the present drainage operations. Indications are that it can be considered only a good start, since virtually all of the Valley in North Dakota is now in soil conservation districts.

Nearly a third—508,350 cubic yards—was excavated in the construction of 43.45 miles of new main drainage canals. Cleaning out 38 miles of old drains required the excavation of 524,084 cubic yards. Ten and a half miles of pothole drainage ditches totaled 105,279 cubic yards. And 579,302 cubic yards were taken out of 294 miles of farm drains, which were built to take the excess water off farms and into the main drainage canals.

At the same time, Soil Conservation Service technicians assisting the Red River Valley soil conservation districts helped 276 farmers work out farm conservation plans in 1945. This included farm drainage systems, rearrangement of fields where necessary, establishment of crop residue management and tree plantings to help control

NOTE.—The author is State conservationist, Soil Conservation Service, Bismarck, N. Dak.

wind erosion—a problem in drier season—and the use of grass and legumes in the crop rotations.

Progress in the establishment of conservation farming here, however, depends to a large extent on the construction of drainage canals. These outlets must be provided before the excess water can be taken from the farms.

Because of its nature, the present drainage work is developing into one of North Dakota's outstanding cooperative ventures. Building or cleaning out main drains requires agreement among a number of land owners in every case. And developing the farm drainage systems and farm conservation plans calls for cooperation of individuals with their soil conservation districts.

give us the benefit of spring moisture and result in better yields."

Brakke uses the "bedding" system of farming. That is, fields are laid out in lands about 150 feet wide, with permanent dead furrows between them. Constant plowing from the dead furrows develops gentle slopes from the lands to the furrows. The furrows lead to the farm laterals, which in turn empty into the main drains.

The growing interest in farm drainage systems was evident last fall, especially in Richland county, when many farmers plowed out dead furrows and others made larger the farm drains they had. This happened even where technicians had not yet been able to help operators plan their systems.

Typical of the nearly level lands in the bed of the glacial Lake Aggasis, which now comprise the lands bordering the Red River in North Dakota. Subject to flooding from overflow of small streams which flow out from the highlands to the west, and from more than ample rainfall during wet years, these lands need draining to prevent severe damage to crops.

Others besides the individuals have cooperated, too. The State, through legislative appropriation, assumes part of the cost. The Soil Conservation Service, supplies engineers and other technicians and a relatively small amount of equipment. The AAA has helped with its conservation payments which amounted to about 8 cents a cubic yard.

How well drainage pays the farmers in this area is told by Albert Brakke, who first gained the benefits of his drainage system last year. His 350-acre farm is a mile east of Wild Rice.

"If these ditches had been here 4 years ago," Brakke said, "I would have been $2,000 richer today. They will help even in drier years, when we do not get flooded during summer, because we will be able to seed our crops earlier. That will

Many thousand dollars were spent constructing drainage structures in the period before 1916. Through neglect, they were permitted to become clogged with brush, grass and wind-blown soil. The above drain, filled with brush and drifted snow could not function, even if farm drains had been built in the adjoining land to feed it.

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Drainage is not new in the Red River Valley. The first was done during the period between 1892 and 1916, when precipitation averaged over 25 inches a year. Approximately 800 miles of drainage canals were built as a result of the organization of drainage districts. Generally, this construction was not followed up with farm drainage systems and results were disappointing.

From 1917 to 1942—a period including the drought years of 1934 and 1936—precipitation averaged only 18 inches a year. Drainage became less of a problem and the drains were neglected. Windblown soil lodged in them. Trees and brush began to grow. Within a few years, most drains were too choked to be of much use.

But in 1942, rainfall jumped to 21 inches. It was higher the next year. In 1944 it totaled 30 inches. And land was flooded with spring run-off and summer rains. Many thousands of acres could not be seeded, or if they were planted the crops were drowned out. Ben Kienhols, Federal agricultural statistician for North Dakota, estimated the value of crops lost in the six easternmost counties in 1943 at $10,850,000, and the loss in 10 counties in 1944 at $13,565,000. Lorne Wilde of the Fargo Forum, writing about the drainage problems last year, estimated the total loss since 1942 at $50,000,000.

Rainfall was only a little more than 16 inches last year, but the need for drainage was still apparent and the record of nearly 1¾ million cubic yards of excavation was made. Some of the lands in the Red River Valley had not produced a crop in 4 years. It is further to be noted that during 12 years of the 1917–42 period, flooding occurred to such an extent that drainage would have helped—some years it was essential.

Drainage problems of the Red River Valley, which was the bed of Lake Aggasiz in the glacial period, are by no means all home-grown. The land is seemingly almost flat for a distance of 12 to 40 miles west of the river. Soil is fine-grained clay or silt loam, deposited by the water. Beaches of the old lake are more sloping and somewhat sandy. Several streams flowed into the lake from the west and northwest, and developed good-sized channels. They still flow. But now, instead of emptying into the lake, they emerge from their upper channels to meander across the old lake bed in the small stream courses they have formed. They overflow easily. Intermittent streams flowing into the valley lose their channels entirely, and the water spreads over a large area of farm land.

This watershed has a total area in North Dakota of 17,165 square miles, of which about one-fourth is in the section where the big drainage job is needed. One inch of run-off from the 13,000-odd square miles outside the old lake bed amounts to nearly 700,000 acre-feet of water. If it runs off rapidly, it is obviously going to cause trouble.

Snow and rain falling on the lands in the valley are another source of flooding, more important in the southern part than in the north because of differences in annual rainfall. After the fine-grained soil becomes wet, it will take no more water and the remainder stands on the surface until it evaporates. Ponding is further assured by the fact that the streams have developed flood plains. The land is higher along the stream banks than elsewhere.

Enough new drains to carry the overflow and also the excess water that falls on the land should be built. Other drains are needed to pick up water from the intermittent streams and take it to established stream courses, thus checking the damage it has been causing. All of the old drains need cleaning, and some must be made larger than their original size. And on both the sandy beach lands and the old lake bed, thousands of potholes should be drained. Some become sizeable sloughs in wet years. Others are shallow and dry up—but usually too late to do the farmers any good.

Although farmers today are most concerned about the damage from flooding during the growing and harvest seasons, an increasing number appreciate the advantage of getting fields drained of early spring floodwaters. This will permit earlier seeding of many crops. There have been few if any dry years in which spring moisture was not enough to produce a fair crop if it was planted early enough. But in many years late-planted crops have been badly hurt by dry weather and summer heat.

The Soil Conservation Service aids soil conservation districts in designing and supervising the construction of new canals and cleaning out old ones, when the district supervisors are asked for such help. First step is to survey the proposed work and estimate the costs. If the group concerned decides to go ahead, detailed plans and specifications are prepared. Construction work is done primarily by contractors, although a small amount has been done with equipment which the Service loaned to the districts for rent to coop-

One of the completed drains, spring of '46. Known as Lost River, the intermittent stream which supplies this flow practically lost its channel several miles west of the place this photograph was taken. There was, however, a very shallow stream course which had been developed, but most of the water used to flow out over a wide area. This drain connects with the upstream channel and carries the water across the lowlands. It prevented flooding last spring.

erators. The groups having the work done arrange for the payment.

Usually, farmers planning drainage form a drainage district to carry on the construction. Some of the smaller groups, however, work together without formal organization to get their drainage jobs done. Those in the drainage districts pay their shares of the cost along with their taxes, while those in the other groups pay the builders direct.

Except in Richland county, locations of most of the main drains needed in the valley are known as the result of a survey made in 1906 by J. T. Stewart, a United States Department of Agriculture engineer. This was during the previous period when rainfall was high and drainage was sorely needed. Stewart's maps are still used. His findings were confirmed later by P. T. Simons and Forest V. King, who published their survey in 1922—during the period when average rainfall was light. Main drains and laterals—not including farm ditches—are needed to the total of more than 3,500 miles.

Design of the main drains is important. They must do their job and still be relatively easy to maintain. The amount of water to be handled determines the size; they must be large enough. And their grades must be enough to move the water along satisfactorily, yet not give the water enough velocity to cause erosion. For ease of maintenance, the side slopes need to be gentle enough for vegetation to become established and also to enable the farmers to control its growth conveniently. A grass cover on the drainage canal banks will check sloughing, and if it is moved periodically will not interfere with the canal's performance. It is one of the important measures to resist the invasion of brush such as had clogged the old drainage canals.

Equally important are the farm drainage systems, lack of which was the principal cause for the disappointing results of previous drainage attempts. In most places, the slope is enough to get the water off the fields if they are arranged so that rows run in the right directions. Other places, where the slopes are less, careful use of the "bedding" system is needed for satisfactory results.

Accomplishments in establishing farm conservation plans in the area where drainage is being done are substantial. They include building farm laterals on nearly 40,000 acres, crop residue management on more than 16,000 acres, grass seeding on 14,000 acres, and planting of 140 miles of shelterbelts and farmstead windbreaks. What this means to the drainage systems will soon be evident, because nearly all of the land along County Drain No. 28 near Galchutt is under conservation plans.

Jack Smedberg near Wahpeton is one who changed the direction of his fields after he learned from the technician that he had been farming against himself. Slight as the slopes on his farm

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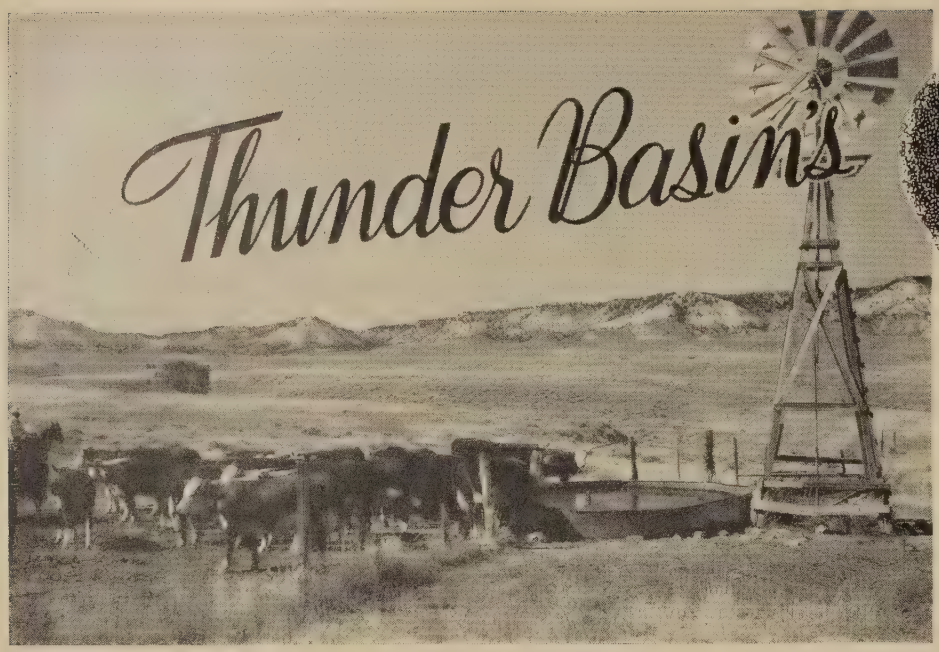

Thunder Basin's COMMUNITY PASTURE

BY EDGAR A. REEVES

Adequate water features the Rosecrans community pasture. This is one of the wells and stock tanks. A series of stockwater dams also has been developed. Thus, both surface and well waters are provided. This is necessary because there are times when the reservoirs get low during dry spells.

COMMUNITY summer pastures, inaugurated on land utilization projects nearly a decade ago, are doing a real job for the small rancher by giving him some of the advantages the larger ranchers enjoy. For example, he now has the economy of a large-scale type of pasture operation, and the advantage of having his stock well protected. He can also get livestock away from headquarters in summer so that full attention can be given to feed crop and hay production.

The success of this type of pasture is typified by the 19,650-acre Rosecrans community pasture located about midway between Douglas and Newcastle. It is used by 18 operators, members of the Thunder Basin Grazing Association. The effects on the ranchers are shown in the experiences of Frank Scott, 17 miles northeast of Bill, Wyo. He is a member of the board of directors of the grazing association.

"These common-use pastures are lifesavers for the small, dependent livestock growers," said Scott, who has spent most of his life in the Wyoming range country and homesteaded on Box Creek as soon as he was old enough.

"Many of us," he explained, "were not able to get enough grazing land close to headquarters to expand to an economic size. In my case, the common-use pasture enables me to run about 150 head of cattle, where otherwise I could handle only 80 to 90 head.

"At the time the pastures were set up," Scott explained, "few people thought they would work out. It was doubted that 10 to 20 operators could run their stock in one pasture and continue on neighborly terms for long. But they did work out. There have been very few serious difficulties."

Scott's ranch and the Rosecrans pasture are situated in that part of eastern Wyoming which was heavily homesteaded. The land utilization project, of which they are a part, was formed to show the benefits to the community of soil and water conservation, adjustment of people to the physical resources, and good land use. It includes privately owned, State and county lands, together with federally owned lands.

The influx of homesteaders in the early 1920's is still fresh in Scott's memory. In fact, he took up a homestead himself although he sold it later to his older brother. Most of the settlers took up 320- and 640-acre tracts for farming. While the climate continued favorable, they got along fairly well. The ranchers, however, were less fortunate. Land which was settled had been their range, and they were being weakened for what was ahead.

Dry years came along. The homesteaders could not make a living on the lands they had. Nor were they able to expand their holdings so as to go into the livestock business. The drought of 1934 and 1936 was the climax. Many left; many wanted to go but could not. The ranchers there could not buy out the remaining homesteaders

NOTE.—The author is state conservationist, Soil Conservation Service, Laramie, Wyo.

because they, too, had suffered from drought, insect damage, and low prices.

Purchase of many of the homesteads by the Federal Government in 1934 and 1935 changed the picture. It enabled the homesteaders to salvage something from their homesteads, pay up delinquent taxes and bills, and move to more favorable locations.

"Our Rosecrans pasture," Scott said, "includes the lands held by 27 homesteaders which the Government bought out. Most had only 640 acres and were having a hard time trying to stick it out. I understand that generally they had found other locations, many in Washington and Oregon, and are doing well. I am glad of that. And I know that the lands they formerly operated here, which are now in the Rosecrans pasture, have certainly helped to get us on a firm foundation."

Much had to be done before the ranchers could be helped to their present status. Abandoned buildings had to be removed and abandoned fields seeded to grass. Stock-water dams had to be built and wells drilled so that there would be plenty of water for the livestock. Grazing had to be allotted so that smaller operators could have use of enough land without interfering with the operations of established outfits.

Development of the purchased lands, which are administered by the Soil Conservation Service, was done by the Federal Government. In Wyoming, this consisted of seeding 21,000 acres of grass, building 212 dams, 13 wells and 492 miles of new fence, and repairing the wells and dams they acquired with the land. Allocation of the use of these lands is handled by the local grazing associations, to which they are leased for a 10-year term. The associations also have leased State, county, private, and other public lands not already leased by individuals.

One full-time rider, Byron Wallen (left), cares for the cattle in the Rosecrans community pasture; he also maintains the fences and improvements. More than 1,000 cattle graze in the pasture during the summer. Frank Scott, seen at the right, is a member of the board of directors of the Thunder Basin Grazing Association.

The Thunder Basin Association is one of those formed by the ranchers to manage the grazing lands in the land utilization project. Both large and small operators are represented on the board of directors, which is elected by the membership. The Soil Conservation Service furnishes technical aid and advice both to the directors in managing the lands they lease and to ranchers who ask their help in developing soil and water conservation plans for the lands they own.

Part of the Rosecrans community pasture near Bill, Wyo., where 18 operators run their cattle in common during the summer grazing season. The land in the pasture is mostly federally owned but it is administered by the directors of the locally organized Thunder Basin Association. The association leases the land, grants grazing privileges according to priorities, and otherwise manages the pasture. Soil Conservation Service technicians aid the directors, help ranchers develop conservation plans on their own lands.

Scott is typical of the smaller operators. He has had a life-long experience with range livestock. So has Mrs. Scott, who is the daughter of Mr. and Mrs. C. C. Dickson, old-time residents of the area. The Scotts were married in 1937 and have three children. The headquarters unit includes the original Dickson homestead, and Mrs. Dickson is a member of the household.

The present Scott operating unit consists of 1,280 acres of deeded land, 1,280 acres of privately owned land that he leases, and a grazing allotment on 3,040 acres of federally owned land. This, together with the allotment of summer grazing in the Rosecrans pasture, gives the Scotts use of enough land to maintain a going family-size concern. The unit is well watered, having seven dams and three wells.

"Talking things over each year has probably done as much as anything to make the Rosecrans pasture the success it is," Scott commented. "All of us who are using the pasture get together each spring and discuss our problems and decide what to do.

"Besides this," he continued, "the grazing association directors set up some basic regulations. One is the setting of the grazing season, usually May 1 to November 30. Another is to require that all bulls must be registered Herefords from 2 to 6 years old.

"All of the ranchers here are Hereford growers and believe in using good bulls, so there are no wrinkles to be ironed out in this arrangement. I understand, though, that there are some pastures where mixed stock is run. In those only the majority breed is admitted to the pasture during the breeding season. The others have separate breeding pastures or are kept at headquarters during breeding."

The Frank Scott household. Adults, left to right, are Mrs. Scott, Mrs. C. C. Dickson, Mr. Scott; children are the Scotts' daughter and two sons.

Besides having the grazing needed to maintain their units, Scott explained, those using the pasture get some other benefits that show up in the profits. For one thing, he said, the cows with calves are separated from the steers. Then, only one rider is needed to care for the stock, which number more than 1,000 head, and maintain the fences and other improvements. This is much less costly than if each of the 18 ranchers had to do this on his own.

The year 1943 gave the Rosecrans pasture a severe test. Spring moisture was none too plentiful, but it filled the stock-water dams. Then followed a dry summer and autumn. The season was unusual also in that for long periods of time there was not enough wind to operate windmills. Most reliance for water had to be placed on the dams. All but the largest dried up. In fact, the winds came to turn the windmills in the Rosecrans pasture just before the last large reservoir went dry.

"If it had not been for the Rosecrans pasture," Scott said, "a lot of us would have been in a tight fix—might have had to sell off. Beside being short of water at home, we might have been short of pasture since the grass in our winter and spring pastures didn't grow too well that summer. I know that some of the bigger ranchers were plenty worried.

"But there was enough feed in the Rosecrans pasture, and water. There was crested wheatgrass early and native grass later, with a good carry-over from the previous years. We were even able to keep the cows there almost a month longer than usual after the steers were marketed. That gave headquarters pastures a chance to recover with late fall rainfall. We had a narrow squeak with water in the pasture, though, because of a lack of wind."

Crested wheatgrass stands high in Scott's list of good things. There are 103 acres of crested wheatgrass at his headquarters, which supplies him with a good share of his winter feed. And there are 1,000 acres of this grass in the Rosecrans pasture.

"It's the coming thing in this country," he declared. "It produces hay on dryland, which is one of the important needs in this area, and is much more sure to produce around here than any farming crop. It makes fine hay if it is cut at the right time, which is early. And it is excellent for early spring grazing.

"I think however, that we could make better use of it for early spring grazing if we fenced the crested wheatgrass fields," Scott continued. "We would be able to graze it harder and longer so as to keep it from growing tall and rank. The stock like it much better when it is fairly short and green.

"As it is, crested wheatgrass is intermingled with the native range and unfenced. As soon as it starts to dry up, the cattle move to the native range. We lost a lot of the value of the crested wheatgrass, and also lose the advantages of keeping the stock off the native grasses a little longer."

But even though there are still improvements to be made in grazing management, Scott will point proudly to what has already been accomplished. He uses his own experiences as an example.

"For one thing," he said, "I'm getting more pounds of beef to sell from the same number of animals. In 1942, my steers averaged 665 pounds. And in 1943—the year with the dry summer—they averaged 681 pounds. Then in 1944 they tipped the scales at an average of 704 pounds, and last year 699 pounds. These are Omaha weights with no cut-backs.

"The high quality Hereford bulls with good characteristics and careful culling of the cows every fall," he concluded, "are essential to herd improvement. But you must have plenty of good grass and water. Overtsocked range doesn't produce heavy steers. The land utilization project has given the smaller operator a firm grip on life, and the common use pastures make it possible to handle the stock the same way the big operators do. Heavier steers and lower expenses make the area one in which taxes and store bills are surer to be paid."

DISTRICT IN ACTION

(Continued from page 103)

outgrowth of the soil conservation program in the community. Local farmers didn't get together and organize a conservation club and then develop the program in the community. A large group of adjoining farms were planned and the practices were applied, in large part, before the club was organized.

Nothing has happened in this community to indicate that community organization will make it unnecessary for farm planners and district supervisors to lay a sound foundation for community organization by first planning several adjoining

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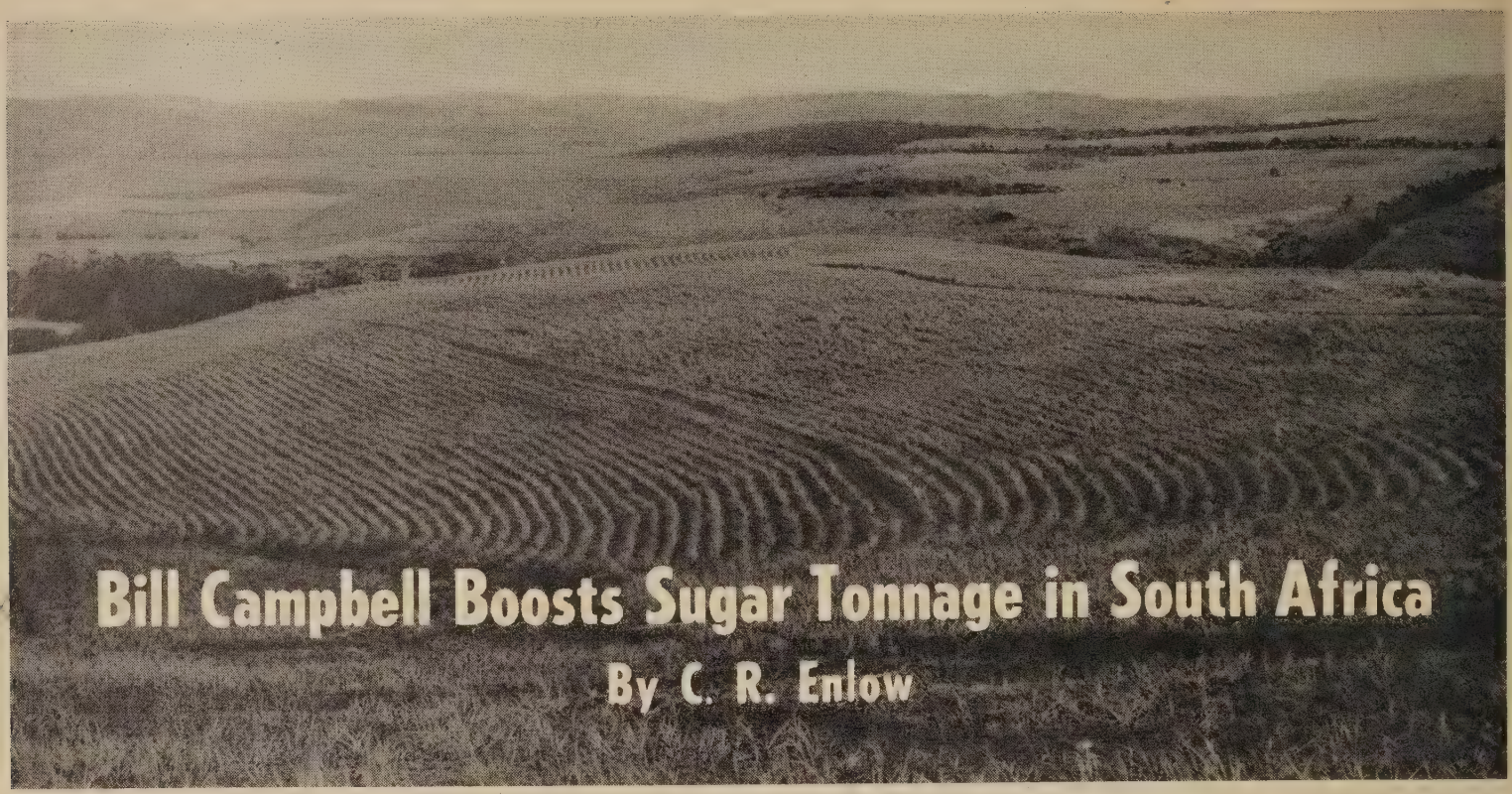


Bill Campbell Boosts Sugar Tonnage in South Africa

By C. R. Enlow

APPROXIMATELY 30 miles north of Durban, Natal, in the Union of the South Africa lies Mount Edgecombe, an attractive little town in a great sugar production area, headquarters of Natal Estates, Limited. It is rolling country, with fields of sugar cane for miles in all directions except east. There lies the Indian Ocean.

Natal Estates Limited consists of approximately 30,000 acres, a rather solid block of land with the sugar factory in the approximate center. It is managed by the young, energetic, personable Urben (Pete) Campbell.

Roads, and a narrow-gauge railroad used to carry sugar cane to the factory, radiate from the factory to all sections of the plantation. Along one side is the Umgeni River, on its way to Durban.

Pete and his associates, back in 1931, installed turbines to pump water up the high, rocky, precipitous bank to irrigate the cane and remove one of the hazards encountered in sugar production in Natal's uncertain climate. For many years, the destiny of Natal Estates was guided by W. A. Campbell, Pete's father. To him must go credit for foresight and determination in establishing and carrying out the policies that have made Natal Estates what it is today.

NOTE.—The author is agricultural attaché: United States legation, Pretoria, South Africa. He was formerly chief of the Agronomy Division, Soil Conservation Service, Washington, D. C.

This field of Co. 281 sugarcane is contour planted. Rows are on a grade of 1:100 for irrigation.

The factory is an extremely efficient unit. It holds the record as the highest-producing factory in the British Empire. It is in keeping with the operation of entire undertaking. The agricultural program is excellent. Selection of cane varieties, planting methods, fertilizers, use of crop residue, irrigation, soil conservation methods—all have been planed carefully, and it is difficult to suggest improvement of methods and techniques.

If the land is farmed for 35 years, and at the end of that period, yields per acre run approximately 35-percent higher than at the beginning, isn't that proof of good farming? Back of this performance lies a very interesting story, dealing with the trials, tribulations, and accomplishments of W. A. Campbell, and the change from ever-decreasing yields of sugar cane to a steady increase.

In the 1910–11 season, 3,070 acres of cane were harvested on Natal Estates. The yield per acre was 33.53 tons of cane, with an annual precipitation of 41.79 inches. Yields began dropping slowly but surely until during the season of 1927–28 only 16.88 tons per acre were harvested, although the rainfall was 40.09 inches that year.

At this point a planned soil improvement program was initiated. At least productive fields

were plowed, and planted to sunn hemp (*Crotalaria juncea*) for a green manure crop, before returning the land to sugar cane. Superphosphate and sulphate of ammonia were brought into the program. Crop residue, which is so heavy as to be extremely difficult to handle, was conserved, and piled in every other row interval. Contour planting was started.

This was the beginning of an increase in yields that has continued to this day. By 1930–31, production for 7,554 acres had climbed to 23.46 tons of cane per acre.

At this point irrigation was started, to supplement the uncertain rainfall, and it has been used as needed to date. During 1945, the Umgeni river actually stopped flowing for the first time on record, and for some time there was much concern about the 1,600 acres of newly planted cane. The drought is now broken, however, over practically the entire Union, and the plantings came through in good shape.

By 1935, the average production of sugar cane on 10,440 acres harvested had reached 29.62 tons per acre. Practically the entire acreage was planted to UBA, a variety that occupied as much as 99-percent of the South African acreage in 1933. UBA was resistant to most diseases, but finally developed a virus of its own and rapidly deteriorated. New varieties developed by Dr. H. H. Dodd of the Sugar Experiment Station at Mount Edgecombe were introduced and by 1944 barely 4-percent of the sugar acreage in Natal was UBA. It had been replaced by the varieties Co. 281 and Co. 301, introduced from India and P. O. J. 2878 from Java. This year the Experiment Station has released another variety, Co. 310, developed from seed brought from India.

Introduction of these disease-resistant, higher-producing varieties of sugar cane had a marked effect on yield at Natal Estates and by the season 1943–44, a yield of 44 tons per acre was averaged from 8,750 acres harvested.

Today the agricultural program on Natal Estates has a permanent aspect. There is no erosion evident, as the contour planting (irrigation grade) plus rotation of 4 years out of 5 in grass (sugar cane), and the other year in a soil-improving crop, gives real soil conservation. Phosphate, lime, and nitrogen are now used as needed to keep production at a high level. The crop residue and sludge from the sugar factory are used to help the sugar cane roots maintain the organic content of the soil. Diseases are controlled by the introduction of the new disease-resistant varieties devel-

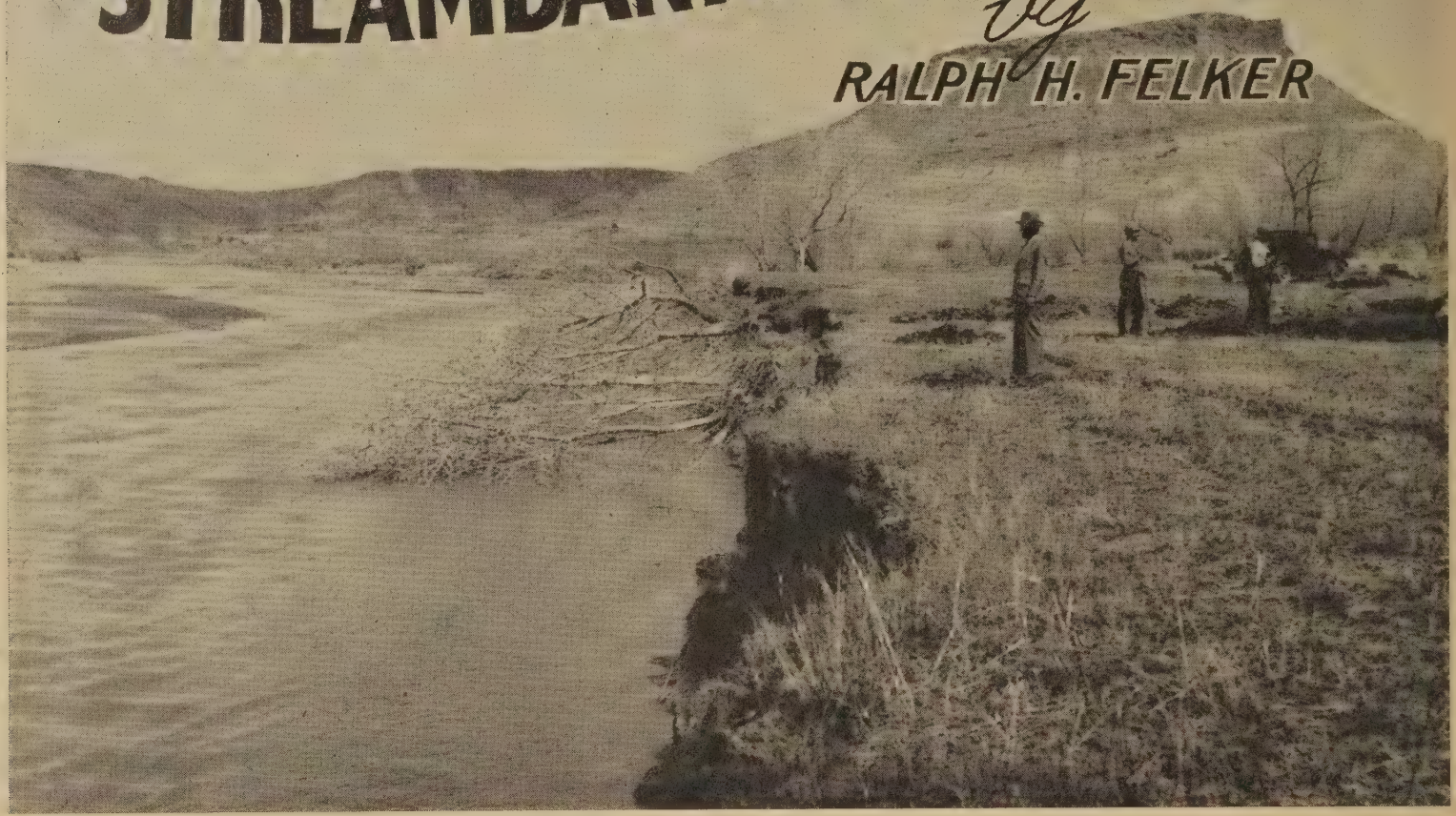
(*Continued on page 118*)

Ridger used to open irrigation furrows, and for furrowing out lines for planting cane. Concrete irrigation ditch has gates at frequent intervals.

STREAMBANK CONTROL··

by

RALPH H. FELKER



A common scene along streams in Utah. Valuable farmland is being swept away by the tons. This happens to be along the Virgin River, on the Antone Nielson farm; time, March 1939.

SPLASH! Another 30 tons of valuable farm land topples into a swirling, silt-laden river. Stream-bank erosion, like any type of soil erosion, spells loss from beginning to end. It means loss to the farmer whose land is caving away and loss to the farmers whose newly seeded pastures are covered with silt and whose water storage is decreased by so many acre-feet. This is serious. And yet, it is happening along every river which flows through cultivated land in Utah, and a high percentage of the cultivated land of the State is crowded into narrow, fertile valleys dissected by one or more streams.

Let us visit the owner of a fertile 80-acre farm along the Virgin River, Duchesne River, or any other river in Utah. To start with, this farmer has an economic unit. However, year by year "Old Man River" is cutting away his most valuable asset, his farm land, until one day, if not stopped, the once-fertile 80-acre farm will not be an economic unit. This means complications. This farmer realized that a few feet of his land were being devoured by the river each year, but he felt it was too large a job for him to tackle alone. And he was at a loss to know how to go about stabilizing the stream bank.

This is but one of the hundreds of farms which are being eroded away by flood waters or even in some cases by ordinary low waters. The sad truth is that many of the farmers are not taking advantage of what they are already paying for—technical assistance from the Soil Conservation

NOTE.—The author forestry specialist, Soil Conservation Service, Panguitch, Utah.

Service, made available through soil conservation districts.

What can and should farmers do to stop this phase of the erosion menace? Let's take a look at three important factors which have a definite bearing on stream-bank erosion:

1. Poor management and denudation of the upper watersheds.
2. Poor farming practices along streams.
3. Poor management of the stream channel.

By changing the word "poor" in each of the above to "better" or "correct," and adding revetments, or the protection of danger points along the streams, we are pretty well on the road to a practical solution.

Now, let us consider the curative measures, with particular emphasis on management of the streams and the protection of critical points along their channels.

Floods originate in the upper watersheds. Research has shown that run-off is much greater and faster on hillsides with sparse vegetation than on land which has a good stand of grass, shrubs, or trees. It follows that better management of the range lands on Utah watersheds will aid greatly in reducing the frequency and size of floods.

There is a common tendency to farm too close to stream banks. Ditches often are within 10 feet of the edge of a vertical stream bank 30 feet high. Under these conditions a gopher hole, a soil crack, or slight trouble with the ditch spells immediate disaster. On one farm in the vicinity of Roosevelt, Utah, five different locations of a ditch can be counted. Each time the ditch washed out it was moved farther back into the field and another gully was formed. In another section of the State a farmer let his irrigation water run overnight. The next morning a 35-foot stream bank was supersaturated and slid off into the stream. One hundred tons of tillable soil would be a low estimate of the loss. In still other instances inadquate disposal structures for waste water have caused numerous new gullies to be formed. In one case a wooden box 10 feet long was being used to dispose of excess irrigation water. Each year the box had to be picked up out of the wash below and set back into the field another 10 to 20 feet. This inadequate structure later was replaced with a well-designed pipe-type structure with a reinforced concrete transition.

The remedy is obvious. The irrigation ditches must be kept at safe distances from the edge of the stream banks. Sometimes low dikes are needed between the fields and the edges of the stream banks. Irrigation water must be closely tended. Better designed irrigation-water disposal structures often are needed.

People usually don't think of "managing" stream channels. Generally the channel is considered a good place to hold livestock. During the winter the high banks and vegetation usually found along streams offer protection from cold winds. During the summer, the stream channel provides a good supply of water for the livestock, as well as shade and some protection from flies. It cannot be denied that there are such values. However, when stream channels are used as stamping grounds, trouble from bank erosion soon follows.

Cattle and horses browse off and trample the young willows and low-growing vegetation. Within a short time the willows along stream banks are killed or opened up to such a point that the banks become vulnerable to erosion from flood waters. This does not mean that bank cutting will not occur where livestock has been excluded. Nevertheless, observations show that a stream with a line of willows established on each side is relatively stable and requires considerably less maintenance than one with raw banks, void of vegetation. The channel, plus a strip 25 to 50 or more feet on each side, should be free from livestock.

Maintenance of stream channels is important. After each flood, the entire stream channel should be checked to determine weak points and trouble areas. If a snag or other debris has lodged in the middle of the channel, it should be removed immediately.

Vegetation growing out into the channel should be removed to provide adequate capacity. If allowed to remain, debris usually will cause the stream to change its course, and this means headaches. The vegetation along the stream should be carefully observed. There may be weak points which can be controlled by planting.

There are several satisfactory methods for controlling active stream bank cutting if cost, equipment, material, and labor are not limiting factors. It is usually possible to work out a plan that is within any farmer's means.

Where structural work is necessary to prevent further bank cutting, it frequently has been found

Tree and cable revetment installed to halt collapse of bank; same site as in first picture; time, September 1939. Note low dike along edge of field.

economical to use a type which will lend itself to the planting of trees. The structural work will provide protection while the trees are getting established.

Tree and cable revetment are effective and economical means of structural bank protection. Properly planned and installed, this type of revetment will provide a partial solution to most of the bank-protection problems in Utah. This type of revetment includes a main cable to which numerous trees have been secured, the cable being anchored at both ends. If the revetment is over 150 feet long, additional anchors should be provided. Actual field conditions must be studied to determine how many anchors are needed. Entire trees are tied to the main cable at any angle of approximately 30°, with tops downstream. They should be spaced 8 to 12 feet apart, depending on the density of the tree crown.

The trees are secured to the main cable with short pieces of cable, one-fourth inch or larger. Very few cable clamps are needed if a metal punch is used to spread the main cable strands so that the smaller cables which secure the trees can be threaded through the strands of the main cable and tied. The size of the main cable and tie cables will depend on the stream and location of the structure. The trees should be allowed to retain as many of their branches as possible. The idea of the revetment is to produce a permeable structure which will tend to still the silt-laden water and build up a silt bar between the revetment and the bank.

When the revetment is placed directly against the existing bank, a modification of this plan may be used whereby numerous short lines of cable with one or more trees attached are anchored individually into the bank.

When trees are not available it is necessary to design a different type of structure. It may be necessary to use tetrahedrons, rock jetties, or mesh wire to halt the bank cutting and form a silt bar on which trees can be planted. These are problems which must be worked out on the ground by the farmer and farm planner, with the guidance of an engineer and forester sometimes indicated.

Seven years later, with the soil pegged down to stay.

Tree and cable revetments have a rather short life, usually 5 to 7 years. After this period vegetation must be depended upon to provide the required protection.

The planting should be done as soon as the silt bar is formed or a planting site is available. If it is possible to plant along the bank before any silt deposition occurs, this should be done. A tree willow, *Salix fragilis*—commonly called crack willow—has been found best suited for bank-protection in Utah. It is large enough to furnish needed mechanical protection and in addition it has a very large fibrous root system that binds the soil. It remains in place and does not spread like the small ditch bank willow, sometimes used in conjunction with the tree form. If sufficient space is available, Russian olive and black locust make excellent supporting species. In addition to their value for bank protection, the black locust in particular will produce excellent fence posts in from 15 to 20 years.

Where willow is used in bank planting, cuttings are sometimes preferred to the nursery-grown rooted stock. In some instances cuttings are better in that they can be set to permanent moisture, and in many places they are easier to plant. The fact that farmers usually have a supply of tree willow on their farms is another point in favor of using cuttings. If properly handled, planted, and cared for, both willow cuttings and nursery-grown material will give satisfactory results.

All stream-bank plantings should be set to permanent moisture. When cuttings are used, approximately 1 foot of the cutting should be left above the surface and planted 1 to 2 feet or more deep. All planting should be done during the dormant season, late fall or early spring.

It must be kept in mind that the job is not over just because the active bank cutting has been halted and tree and shrub-planting has been done. Annual maintenance is essential. If additional density is required for the cable revetment to function satisfactorily, more trees should be tied to the main cable. Plants which do not survive must be replaced. Snags or vegetative growth in the channel must not be permitted to remain, as this cuts down channel space, and causes the river to be diverted. Finally, livestock must be kept out. If done annually, maintenance is not a big job.

DRAINAGE IN RED RIVER VALLEY

(*Continued from page 107*)

are, they are still enough to carry the excess water to the farm laterals if the rows are in the right direction.

E. H. Lees near Harwood brought 80 acres into production when he and the county agent dynamited a ditch which the Soil Conservation Service technician had laid out for him. The 1945 crop there, he said, was worth at least $2,400.

Ben Gorder, also of Richland county, feels sure his pothole drainage will repay the costs each year because he will be able to seed his crops 10 days to 2 weeks earlier in spring. He strip crops, too, in order to control wind erosion.

Ed Kruse, near Barney, reports that the drainage work he has done already increased crop production by about $2,000 last year. He is building more farm drains to prevent water ponding on other parts of his farm.

Oscar Lee, near Fairdale, eliminated two large potholes that cut up a quarter-section in a way to make it hard to farm and quackgrass difficult to control. This drainage, he estimated, increased the value of the land by $1,000.

These men are all cooperators with soil conservation districts in the Red River Valley. Their numbers have grown as has the area in districts. Large-scale operations started first in Richland and Cass counties, where the farmers organized the Three Rivers, Antelope, Fairmont, Southeast Cass, and Rush River soil conservation districts in 1943. Since then the Northeast, Southeast and West Traill county, East Grand Forks, and East and West Pembina county soil conservation districts have been organized by the farmers. Previously organized were the Walsh county and Grand Forks districts, in 1940 and 1941, which are now entering into the drainage program.

This brings virtually all of the area requiring drainage into soil conservation districts. With the plans already under consideration by the farmers and release of contractors from wartime activities, the Valley seems ready to attack the drainage problem in earnest.

Mr. District Supervisor! Have you subscribed for *Soil Conservation?* It will help you do a better job. One dollar per year. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C.

BILL CAMPBELL

(*Continued from page 113*)

oped by the experiment station. The entire staff is on its toes, watching for opportunities to improve the system.

An illustration of how new techniques are put into practice immediately at Natal Estates was demonstrated this year. The experiment station found that if the ratoons to be planted were first dipped in a mercurial solution, they would start growth and continue to grow without evidence of disease for several weeks, even without adequate moisture. Although this was something entirely new in practice, all the ratoons planted on 1,600 acres in 1945 were treated before planting. The treatment is undoubtedly responsible for the excellent survival in this worst year of drought in the history of sugar cane production in Natal.

With such intelligent and aggressive leadership as exhibited by the Campbells and with an unlimited supply of inexpensive labor, it is evident that Natal can compete with any country in sugar production. It is an industry that is on a permanent footing.

DISTRICT IN ACTION

(*Continued from page 118*)

farms and getting several of the planned practices applied on each farm. After this is done, it is relatively easy to develop a community organization that will be useful in speeding up the planning, application, and maintenance of soil conservation on the farms of the community.

This community organization and local farmer leadership came to the Fork Shoals Road Community as a result of hard work and some careful cultivation of the whole idea by a modest, capable work-unit conservationist, Hermas Granade. He planted the seeds and cultivated this entire community project as carefully as any other good husbandman would grow a crop or an orchard. Like a well-tended orchard, this project is bearing fruit.

Schools and civic organizations will be interested in *Soil Conservation's* coming issues: experience stories, educational items, technical tips, usable ideas, notes on district activities.

Within my hand a bit of moist earth I hold, fresh from the new-turned furrow. As I pause to rest, my idling fingers gently press the fertile mold, whose mysteries have challenged long and earnest quest.

I fain would know the story of these grains of sand, the silent legends buried with the silt and clay, and hear the rush of phantom rivers through the land to meet the vanished oceans of forgotten day.

I think of ancient mountains, prehistoric plains, and hosts of lowly creatures bred and nourished there; of massive rocks that held these tiny soil grains which from the distant past their meager message bear.

Despised earth, thy grimy blackness is a shroud for struggling forms that pulsed and perished in the past, that man might tread and till a soil with life endowed and garner stores of wealth that centuries amassed.

Holy earth, we pledge to use our heritage and hold its conservation as a trust sublime. Our husbandry will not condone the sacrilege of wasting from thy fields the precious gifts of time.

Site of National Terrace Contest recently held near Malvern, Iowa. Inset shows the winner, Norman Hull, who hails from Palmyra, Nebr. (Photograph by R. W. Hufnagle.)

U. S. GOVERNMENT PRINTING OFFICE: 1946

Winter Harvest

See "World Demand for Wood"

January 1947

SOIL CONSERVATION

OFFICIAL ORGAN OF THE SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

SOIL CONSERVATION

CLINTON P. ANDERSON
SECRETARY OF AGRICULTURE

HUGH H. BENNETT
CHIEF, SOIL CONSERVATION SERVICE

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WELLINGTON BRINK, EDITOR

CONTENTS

Front Cover: Skidding piling taken from woodlot on Clarence Strand farm, Houston, Minn. Photo by Gideon.

SOIL CONSERVATION is issued monthly by Soil Conservation Service of the United States Department of Agriculture, Washington, D. C. The matter contained herein is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business, with the approval of the Director of the Budget. SOIL CONSERVATION seeks to supply to workers of the Department of Agriculture engaged in soil conservation activities, information of special help to them in the performance of their duties. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., 10 cents a copy, or by subscription at the rate of $1.00 per year, domestic; $1.50 per year foreign. Postage stamps will not be accepted in payment.

Farm responds to Paul Whiteman's baton

Hat in hand, the bandleader discusses his farm plan with the author of this article.

BY CONSTANTINE J. CONKES

Nature and homestead in harmony. Whiteman's farm was not always like this.

PAUL WHITEMAN, famous bandleader, wears a broad grin these days. Ask why, and he'll tell you it's because the 250-acre farm he bought in 1940 is finally buttoned down. But don't ask him anything more—not unless you have an afternoon free to listen to a conservation lecture.

Whiteman, who quit touring the big time dance-hall circuits several years ago, now spends half of each week at his Rosemont, N. J., farm, where he raises Aberdeen Angus breeding stock. Like all cattlemen, his goal was always to raise at least a substantial part of his feed needs right at home. That he didn't do until last year when he decided he had let enough of his rolling acres scoot out to the Delaware River where he figured they weren't doing anyone any good. His first step was to call in Howard Mason, district conservationist for the Morris-Warren Soil Conservation District, and ask him to do something about his jitterbugging fields. Mason advised a complete conservation farm plan. And there's never been a more conscientious follower of the soil conservation plan than the hefty Whiteman.

He buckled right down and got 30 acres strip cropped. Then he constructed, a 1,600-foot diversion terrace, the first of 8 to be built on the farm. That doesn't mean that Whiteman sat back on the cool white porch of his farm home and gave orders. He hoisted on his size 46 dungarees, pulled down the brim of his fawn-colored 10-gallon hat, rolled up his ample sleeves, and pitched in. Labor was scarce during 1945 and many an hour the big fellow, who spent so many years wielding a baton before admiring throngs, sweat off pound after plentiful pound driving a 3-bot-

Paul Whiteman likes Aberdeen Black Angus cattle. His herd numbers 85.

(*Continued on page 124*)

NOTE.—The author is work unit conservationist, Soil Conservation Service, Flemington, N. J.

WORLD DEMAND FOR WOOD

AN EDITORIAL BY JOHN W. KELLER

THE demand for wood of all kinds greatly exceeds the quantity currently being cut in the United States. In 1945 the goal set by Government experts for our national lumber production was 32 billion board feet. The quantity actually produced was only 27½ billion feet. In 1946 again, we need at least 32 billion board feet, but production is expected to fall below this figure. This situation is likely to continue for a number of years. The potential lumber demand of the United States for the next 10 years, according to the Department of Commerce, is 39 billion board feet annually. We shall need 18 million cords of pulpwood within that period, but production is expected to fall short by 2 million cords. Utility companies will need millions of poles and ties, construction companies will need vast quantities of building materials, and farmers will need 70 million cords of fuel wood and 350 million fence posts in addition to repair and building lumber. No one can predict the wood products that will be required for new uses of wood such as impreg, compreg, staypak, papreg, and for laminated and molded wood products. Production is not expected to meet the demand. In fact, postwar reconstruction in the United States is endangered because of lack of wood.

The war-torn countries across the oceans also are desperately in need of wood. They have called upon the United States, and millions of board feet have been exported to them. Russia has the world's largest supply of wood, but she will need all she can manufacture and transport for a number of years to rebuild her own country. The Czechs and Rumanians have small quantities of wood for export, but the transportation lines are out and their supplies cannot be gotten to market. Norway, Sweden, France, Germany, and Finland have small supplies for their own use. Sweden and Finland may have a little to spare for export. England, Holland, Belgium, Italy, Greece, and many of the other small countries must import wood to meet their needs. With their buildings and bridges destroyed, their furniture and the interiors of their houses pillaged for fuel for cooking purposes, and transportation crippled, it will be a long time before their available wood supplies will meet the current needs.

These facts mean that the 137 million acres of farm woodlands on the farms in the United States are indispensable not only to the farm prosperity, but to the prosperity of the country as a whole. Farm woodlands are now furnishing more than one-third of all the wood products produced in the United States. This is more than their share, but they must furnish more. We know that with careful cutting and protection, farm woodlands are capable of producing eventually from 2 to 3 times as much wood as now, and the country needs it to meet the timber demand. The Nation needs well-managed woodlands also for conservation of soil and water.

Many chemical products made from wood can be made also from fodder, straw, and grains of cultivated crops. If the supply of wood products is not sufficient, more cultivated crops will be grown. This may bring such pressure on the land that land of capability classes IV to VII will be cultivated, with the result that soil erosion problems will be intensified. This need not happen if we apply the woodland conservation practices of protection, planting, and careful cutting on our present farm woodlands.

WHITEMAN FARM

(*Continued from page 123*)

tom plow over the lonesome contoured route planned by soil conservation technicians, until he finally etched out the long diversion terrace which he'd set his heart on finishing before seeding time.

He buttoned down the soil all right! So much so that he reached the goal he'd set for himself—plenty of food for his stock—from his own fields. He filled his two silos with the yield from 10 strip-cropped acres last year. The year before that, it required 30 acres to grow that quantity of corn. To take care of his year-around needs, he had corn from another 25 acres, 1,000 bushels of barley from 17 acres, 400 bushels of wheat from 10 acres, and the yield from 40 acres of timothy, clover, and alfalfa.

Whiteman doesn't claim that strip cropping and terracing alone are responsible for his handsome gains. He believes that putting each acre to its

(*Continued on page 141*)

After 100 years . . .

Giant machine strikes climax to a century of activity by Maryland farm leaders. Dr. Bennett is at left of cab. At left, on cab itself, is Maryland's Governor Herbert W. O'Conor. Below him is Senator James M. Tunnell, Sr., of Delaware.

By William S. Otto and Donald A. Hannaman

ON THE EASTERN shore of Chesapeake Bay, where Delaware meets Maryland, 650 persons gathered last September 25, beside the banks of the Pocomoke River. They were there to watch Delaware accept responsibility from Maryland for the completion of the 20-mile channel which will drain approximately 100,000 acres in the two States. Promptly at noon, a giant drag-line scooped through the last few feet of Maryland soil remaining on the project.

Present for the historic event were Maryland's Governor Herbert W. O'Conor, Delaware's Senator James M. Tunnell, Sr. On hand, too, were Dr. Hugh H. Bennett, Chief of the Soil Conservation Service; Dr. H. C. Byrd, president of the University of Maryland; Dr. Austin L. Patrick, Regional Conservator for the Soil Conservation Service in the Northeastern States; and Dr. T. B. Symons, director of extension in Maryland and chairman of the State soil conservation committee.

The Pocomoke project was first planned over a hundred years ago when farm leaders in the vicinity staged a lottery to raise funds to dredge the sluggish stream. Dr. Bennett, in the principal address of the day, declared that wetlands such as those of the Pocomoke are the last frontier remaining in America. He extolled, as an outstanding example of interstate cooperation, the joint efforts of Delaware and Maryland in building this largest drainage ditch east of the Mississippi.

The final phases of the Pocomoke project commenced in 1939 with CCC boys doing the initial surveying and clearing. Later work was done by conscientious objectors of the CPS. Technical assistance was first given by the Bureau of Agricultural Engineers whose operations subsequently were assigned to the Soil Conservation Service.

Note.—The authors are, respectively, District Conservationis' and Engineering Specialist, Soil Conservation Service, Salisbury Md.

A Dream Coming True

Address prepared by Dr. Hugh Hammond Bennett for delivery on Hugh Bennett Conservation Day, Wadesboro, N. C.

IT IS NOT EASY for me to tell you in any adequate way how honored I am on this day, which has been named for myself, and how very much I appreciate this expression of your kindly feelings.

You have asked me to come back home to my people today so that you might extend some tangible expression of your appreciation and good will concerning my work in soil conservation. I am accepting in the fullest personal sense this interest of yours and your kindness and hospitality, even though actually—and properly—you are paying tribute to a movement: Conservation of soil and water, a movement the objective of which is the welfare of the community and each individual in the community.

I don't know anything about how people who are honored as you have honored me today are normally affected by this sort of thing; but, as for me, this kind of expression by one's life-long friends is deeply touching. I hope I can go ahead with my part of the affairs of the day. Perhaps, the best way is to change the subject.

With your permission, I am going to discuss the national program of soil conservation—what it is, how it came about, and the progress that's being made. I may take advantage of the occasion to present some of my own experiences in relation to the development of the program. It would be difficult not to do so under present circumstances.

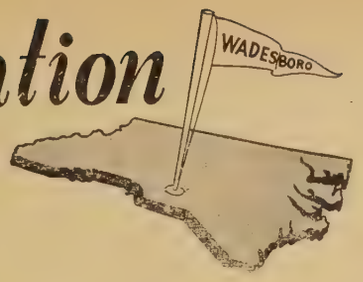
Let me say first that only a few years ago there was so little interest in this subject over most of the country that I never dreamed I would live to see the progress that's been made today. We have moved ahead in the United States from the unenviable position of wasting our basic resource of productive land at a faster pace than any nation or race that we know about, civilized or barbaric, up to the position of world leadership in the field of soil and water conservation. Specialists are now coming from the ends of the world as representatives of governments desirous of learning how we go about this task of taking good care of our agricultural lands. At least 30 countries are taking up our national pattern of soil conservation. Don't misunderstand me: We are not at all satisfied with present progress; we are still losing every year something like 500,000 acres of cropland by unnecessary soil erosion. But—and this is important—we do have a going program and we have learned a great deal about how to get the job done. The trail has been blazed; we are on the way. Last year, for example, we did more conservation work than in any previous year, even with shortages of technicians, machinery, and so on. We planned, in soil conservation districts, 20½ million acres and finished the job of putting conservation practices onto 13½ million acres of land in 1945. This year our goal is to double last year's output; the prospect for that looks good. And then, next year, we are going to do our best to double that accomplishment again. If we can do that—and I think we can—we really will be getting along with the prodigious job of safeguarding more than 700 million acres of crop, grazing, and other kinds of land needing protection.

Looking back—a very long way back, it seems to me—I remember an occasion when my father was laying off terrace lines over on the Peter Place with an old-fashioned wooden "horse." A level attached to a cross-bar on this home-made contraption made it possible to survey out quite satisfactory terrace-grade lines. This was about 55 years ago. I recall this incident, because I had been assigned the task of making marker holes with a hoe at one end of the widely-straddling legs of the leveling outfit, so that the plowmen could follow the lines in constructing the terrace embankment.

I remember asking why we were doing this. My father's laconic reply was: "To keep the soil from washing away."

That incident, however, had very little to do with the development of any particular interest on my part in the national erosion problem, insofar as I can recall. But the concern of my father about holding onto his soil—his capital asset—

Proclamation



WHEREAS, Hugh Hammond Bennett, an Anson County farm boy, has through his deep love for the soil become an outstanding figure in soil conservation in this and many lands, and

WHEREAS, he has tirelessly dedicated some 43 years to study and instruction in land preservation, first in his own State, then in the Nation, and finally in the nations of the world, and

WHEREAS, he has waged an unremitting fight for wise land use in the past which led to his eventual appointment as chief of the soil conservation service, and is at present still conducting a vigorous fight for the Nation-wide adoption of soil conservation measures to protect the Nation's resources for this and future generations.

THEREFORE, I, R. Gregg Cherry, as Governor, hereby designate and proclaim—in connection with a home-coming celebration in Mr. Bennett's home county of Anson—that the day of September 9, 1946, be Hugh Bennett Conservation Day in North Carolina.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the Great Seal of the State of North Carolina to be duly affixed.

[SEAL] (Signed) R. GREGG CHERRY,
Governor.

By the Governor:
(Signed) JOHN HARDEN,
Private Secretary.

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came back to memory vividly later on when I began to see what serious damage uncontrolled water was doing to the United States.

Terracing was about the only thing that farmers did in those days for the specific purpose of controlling erosion. In most parts of the country, we were not even using terraces—farmers were doing just about nothing, generally, beyond throwing a few cornstalks into a gully occasionally.

I think my first real interest in the subject was when, 41 years ago, W. E. McLendon, of Bishopville, S. C., and I were making a soil survey of Louisa County, Va. (1905).

Our chief, the head of the old Bureau of Soils, instructed us to look carefully into the reason behind the reputation of the locality for its poor land. This was stimulating, something outside daily routine. We found a good deal of naturally poor land which consisted principally of decomposed talcose rock, but we found also much sloping land which had been made poor by erosion. In wooded areas that never had been plowed, we found, without exception, deep loam soil which was so soft and mellow at all times you could dig into it with the bare hands. In many adjacent fields, however, we found hard clay subsoil at the surface. This clay dried out almost to the condition of rock with every drought. Originally, the soil in such places was like that in the woods; but with cultivation a profound change had come about: The mellow topsoil had been stripped off by rainfall, a thin layer at a time, as muddy water flowed off the fields into the streams with every rain. Then it was that we learned the real meaning of sheet erosion: The removal of a thin layer, or sheet, from the surface of entire sloping fields as suspended material—mud—in the runoff of rainfall.

Following that basic discovery, my next revealing awakening was in Fairfield County, S. C., where we made a soil survey in 1910–11. This survey revealed that of the 483,000 acres in the county, 137,000 acres, 28 percent, had been so damaged by erosion that it had no further practical value for any immediate cultivation. In addition, the topsoil had been largely stripped from 79,000 acres, or 16 percent of the area. Thus, in this relatively small county, 216,000 acres, 45 percent of the total area, had been ruined or severely damaged by erosion.

Since that time, the damaged area has extended further. Some of the roads we drove over in 1911, with horse and buggy, have been completely

Contouring comes to a farm near Ellerbe, N. C.

Resolution

Town of Wadesboro

WHEREAS, the soil is our most priceless natural resource, giving us food, clothing, and shelter; and

WHEREAS, the town of Wadesboro, all its businesses and industries, and all its citizens depend for their prosperity and well-being upon the preservation and wise use of our soil resources; and

WHEREAS, Hugh Hammond Bennett, who was born on a plantation near Wadesboro, has for 43 years devoted great energy and magnificent leadership to the conservation, improvement, and wise use of our land resources; and

WHEREAS, Hugh Hammond Bennett as chief of the Soil Conservation Service of the United States Department of Agriculture, has directed a Nation-wide program of soil erosion prevention and control, and proper land use, of such soundness that many other countries are following this example; and

WHEREAS, the Board of Supervisors of the Brown Creek Soil Conservation District, including the farm lands on which Dr. Bennett was reared, is the oldest such district in the United States; and

WHEREAS, the board of supervisors of the said Brown Creek District are sponsoring in Wadesboro, September 9, 1946, the Hugh Bennett Soil Conservation Day celebration in honor of this our native son;

NOW, THEREFORE, BE IT RESOLVED, that the board of commissioners of Wadesboro, N. C., in regular session, desire to commend the supervisors of the Brown Creek District for their recognition of Dr. Bennett:

AND BE IT FURTHER RESOLVED, that this Board joins in expressing its appreciation of the life and accomplishments of the said Dr. Bennett and extends to him the freedom of the town;

AND BE IT FURTHER RESOLVED, that this resolution be spread upon the minutes of the board of commissioners of the town of Wadesboro, and that a copy of the same be presented to Dr. Bennett.

I, W. L. Ashcraft, clerk to the board of commissioners of the town of Wadesboro, Anson County, N. C., do hereby certify that the foregoing is a true and correct copy of a resolution adopted by the commissioners of said town, and in testimony thereof I do hereunto set my hand and the official seal of the town of Wadesboro.

[SEAL] (Signed) W. L. Ashcraft,
Clerk to the board of commissioners of the town of Wadesboro, N. C.

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abandoned. On at least one road we recently found it best to go all the way through to the other end once we had started, so difficult it would have been to turn around, because of encroaching gullies.

The rural population when we were there was 29,442 (census 1910); the corresponding population in 1940 was 13,462 (census 1940). That is one of the things uncontrolled soil erosion does.

I thought, way back there, that when the Fairfield survey report was published it would arouse considerable interest; but, after being distributed by Congressman and agricultural authorities of South Carolina and the United States Department of Agriculture, it didn't even ripple the placid surface of national complacency with respect to the welfare of the land. And this was one of the first quantitative measurements of the effects of soil erosion ever made. Obviously people were not interested.

Not much could be done in those days toward creating national interest in the subject. Findings more or less like those in Fairfield County were reported from other parts of the country, such as Stewart County, Ga.; Lauderdale County, Miss.; and Caswell County, N. C. But nothing was done; no interest, no comments, just pure indifference—the inheritance of those halcyon days when our forefathers unfortunately felt we could never use up our supposedly limitless supply of "indestructible" land. Some well meaning students of soils got so sidetracked onto complex fertility studies, in those days, they forgot about, or didn't understand, the terrific rate at which good farm land was being unnecessarily gutted by erosion. Yet, from about 1890 to 1935, according to my estimate, we were losing in this country, as the result of erosion, approximately a million acres of crop and pasture land every year, the areal equivalent of 10 thousand 100-acre farms.

(TELEGRAM)

JOE M. LILES, *Chairman, Board of Supervisors,*
Brown Creek Soil Conservation District,
Wadesboro, N. C.

YOUR HUGH BENNETT DAY CELEBRATION IS GRATIFYING TO US WHO WORK WITH HIM. NO CONSERVATIONIST BETTER DESERVES THIS RECOGNITION. YOU OF THE BROWN CREEK DISTRICT AND ANSON COUNTY MAY WELL BE PROUD OF HIM AND HIS SOIL CONSERVATION ACCOMPLISHMENTS. THE FACT YOU VOTED THE NATION'S FIRST SOIL CONSERVATION DISTRICT DOUBTLESS HAS BEEN SPECIAL INSPIRATION TO DR. BENNETT. DEPARTMENT POLICY LONG HAS SUPPORTED THIS KIND OF WORK AND I HOPE DR. BENNETT MAY LIVE TO SEE HIS DREAM OF UNIVERSAL SOIL CONSERVATION FULFILLED.

(Signed) CLINTON P. ANDERSON,
Secretary.

SEPTEMBER 4, 1946.

It was even worse than that. Some folks got their feet so far off the ground as to say: "The soil is the one indestructible, immutable asset that the Nation possesses. It is the one resource that cannot be exhausted; that cannot be used up."

When I read this, I learned that it was possible to pack a lot of misinformation in two short sentences, even when the statements carry the full resounding ring of what is sometimes referred to as eloquence. The truth is, we can get along with what is left of our productive land only if we take scrupulous care of every remaining acre. Too many farms, too many localities, have already come to ruin for any further theorizing, philosophizing, listening to "rugged individualism," high-sounding panaceas, and so on.

In the meantime, still looking at the historical side of soil conservation, a few people were writing a little and talking a good deal about the subject of soil erosion. Finally, after a long time, there was begun in the United States Department of Agriculture an educational campaign on the subject. Among other things, we published a bulletin called "Soil Erosion A National Menace." Some of the newspapers and an occasional agricultural journal printed extracts from our educational material. Later, some of the magazines began asking for articles on the erosion problem and what to do about it.

Then, in 1928, I was asked to present to a congressional committee handling appropriations for the Department of Agriculture the whole national problem of land damage by erosion and what needed to be done as a first step toward getting under way a Nation-wide program of conservation (Hearings on the Agricultural Appropriation Bill for 1930, 70th Cong., 2d sess., pp. 310–330, Nov. 21, 1928). As a result, an appropriation was made through the Buchanan amendment providing Federal funds to set up regional erosion stations for measuring the rates of soil and water losses, for making surveys to determine the extent of damage by erosion and location of the principal areas affected, and for working out methods of control .

It was not long before overwhelmingly convincing information was acquired in quantity at these stations. For example, at the 10 stations established on 10 very important types of farm land scattered throughout the country more than 200,000 quantitative measurements were quickly made of soil and water losses under different conditions of land use. In rapid order, estimates were thus replaced with measured facts.

West Rocky Ford Church, west of Bennett's old home. It was formerly one of the Bennett plantation schools.

It is interesting to note in this connection that some of the estimates relating to the vast extent of land damage which I had previously turned loose on an unprepared public—of which there was some criticism in a few papers here and there—proved to be underestimates. With the new information, it was possible to say at this later stage, for example, that every year enough soil was being washed out of our fields and pastures to load a train of freight cars that would encircle the earth 18 times at the equator. Nobody challenged that statement, even though it was much larger than any preceding estimates.

So much for history and the problem. Let's look now into the matter of what's being done about it.

First of all, a national consciousness as to the extent and seriousness of erosion has been developed. That alone is worth a great deal, because when Americans get an idea thoroughly implanted in their heads they are about as determined as any people on earth in doing something about it. I don't mean that all the facts have been absorbed into public understanding yet. They haven't been, of course, but there has been enough advanced thinking to give those of us who are engaged in the conservation job a great deal of encouragement. For example, banks, railroads, newspapers, civic organizations, soil conservation districts, manufacturing establishments, and individuals are providing for conservation prizes of various kinds and are putting out an enormous amount of effective educational information.

There is another thing—and it's very important. Too many people still seem to think that the food they buy in cans and sacks down at the corner grocery store somehow grows right there in the store.

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They still fail to understand that food comes from productive land and from nowhere else. They don't think about it, really.

Why, it has taken more than 19 centuries—since the beginning of Christian civilization—for this fundamental fact regarding the source of food to find its way into common understanding, if it really has advanced that far, is most difficult to understand. There is plenty of evidence in the Bible, by inference at any rate, that when productive land is damaged by erosion, the fruitfulness of our fields is undermined. The poorer yields from sowings on stony ground (Matthew 13 : 3–8) may have reference to land reduced to stoniness by continuing erosion. Listen to what the Apostle, St. Matthew, said:

"Some [seeds] fell upon stony places, where they had not much earth: and forthwith they sprung up, because they had no deepness of earth;

"And when the sun was up, they were scorched; and because they had no root, they withered away.

"* * * But other fell into good ground, and brought forth fruit, some an hundredfold, some sixtyfold, some thirtyfold."

Anyway, we remained blissfully ignorant of the full meaning of productive land down across the centuries until some 15 years ago. Until then, you seldom heard the word "topsoil" used. No one but a few soil specialists and excavators of earth ever made any very meaningful use of the word "subsoil."

Those who talk about the effects of diet on health and those who broadcast the beneficence of vitamins seldom recognize the important part the soil plays in providing a healthful diet. Many of us probably need to stop every now and then for more thoughtful consideration of the fact that when topsoil is permitted to wash off the land, the process takes the whole soil and all it contains, including elements of nutrition—minor elements as well as major elements—along with the microscopic organisms that help make land productive. We need also to realize that what is so often left behind for the farmer to till is unprocessed raw subsoil which is far less absorbent of rainfall than was the topsoil, is more difficult to plow, is deficient in all available nutrients, and is much less productive. Subsoil can be improved, of course, but lost topsoil cannot be restored in measurable time.

A good many parts of the world have been so damaged by erosion that the people are gone and all the works of mankind have fallen into decay and ruin. The city of Antioch in Syria, for example—where the Apostle Paul had such a struggle in getting the Christian religion established—was so deeply covered in one section by erosion debris washed down from the adjacent mountains that archaeologists had to dig 18 feet in places to reach the tops of the magnificent structures that graced this once great city.

Some years ago, I visited Dr. T. L. Shear at Princeton University, on his return from the excavation of the theater at ancient Corinth, to whose inhabitants St. Paul directed some of the most famous letters ever penned on earth. I asked the famous archaeologist how deep he had to dig to reach the theater. "Forty feet," he said. Then I asked where the covering material came

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Resolution

County Bar Association

WHEREAS, Hugh Hammond Bennett, a native of Anson County, and Chief of the Soil Conservation Service, has won national and internationl recognition for his leadership in soil conservation and good land use; and

WHEREAS, today, September 9, 1946, is by proclamation of the Honnorable R. Gregg Cherry, Governor of North Carolina, designated as Hugh Hammond Bennett Soil Conservation Day in North Carolina, and

WHEREAS, today, September 9, 1946, the supervisors of the Brown Creek Soil Conservation District, the first of more than 1,650 farmer-organized and farmer-controlled districts in the Nation, are sponsoring a special celebration in honor of Dr. Bennett;

NOW, THEREFORE, BE IT RESOLVED, that at the conclusion of its work and when adjournment is taken on this day of special significance, this Court do adjourn in honor of and respect to the life and accomplishments of the said Hugh Hammond Bennett; and

BE IT FURTHER RESOLVED, that this resolution be spread on the minutes of this term of the Superior Court of Anson County, and that a copy be presented to Hugh Hammond Bennett.

I, Barrington T. Hill, clerk of the superior court of Anson County, N. C., do hereby certify that the foregoing is a true copy of the Resolution adopted by the Anson County Bar Association at a regular term of the superior court at Anson County while in session on this, Monday, September 9, 1946.

[SEAL] (Signed) BARRINGTON T. HILL,
Clerk of the Superior Court of Anson County,
North Carolina.

from. "Washed down from the adjacent hillsides where most of the vegetation had been removed by goats," he replied.

Is there any wonder we are hearing from Greece that there probably is more erosion there than in any other European country? (Several of our employees are now working on the erosion problem of Greece.) There is plenty of erosion in Italy, too, but it appears not to be so bad as that in Greece. Perhaps some of the Italian people took counsel from Pliny (23 to 79 A. D.) who advised farmers tending hillside fields to run their furrows across the slopes and to provide channels to "draw off the water into drains." This may have been the beginning of the modern field terrace.

We have learned, also, that various older parts of the world, as in Asia Minor, have lost so much soil that nations and even civilizations have expired as a result.

The best farmer device yet invented for dealing firsthand, effectively, and democratically with the matter of taking care of our agricultural land is the soil conservation district. These districts are subdivisions of State government for soil conservation and good land use. They are brought into existence through the vote of the farmers themselves and are operated within their locally established boundaries by the farmers through their elected officers.

The growth of soil conservation districts is truly an American phenomenon and serves as the clearest, most significant kind of evidence to show how deeply the soil conservation movement has taken root in the agricultural life of the United States during the past several years.

Since 1937, soil conservation district laws, or laws that permit similar working arrangements, have been enacted by all 48 States and Puerto Rico. In the beginning, I had the feeling that if so many as 10 States passed such laws in 10 years that would be good progress. However, since the establishment of the first district in the United States—the Brown Creek Soil Conservation District here in Anson County, on August 4, 1937—nearly 1,650 districts have been formed throughout the country. These embrace about 900 million acres and 4 million farms—two-thirds of all the farms in the country.

In these districts, we have for the first time, I am convinced, really local farmer control of agricultural matters pertaining to the welfare of the land. Their formation, control, and operation are thoroughly democratic, from the first step of circulating a petition for a referendum, through voting in the referendum, to the election of district supervisors after a majority of the farmers have favored the establishment of a district. In these soil conservation districts, farmers are working together, especially in locality groups more or less bound together by community ties and land problems.

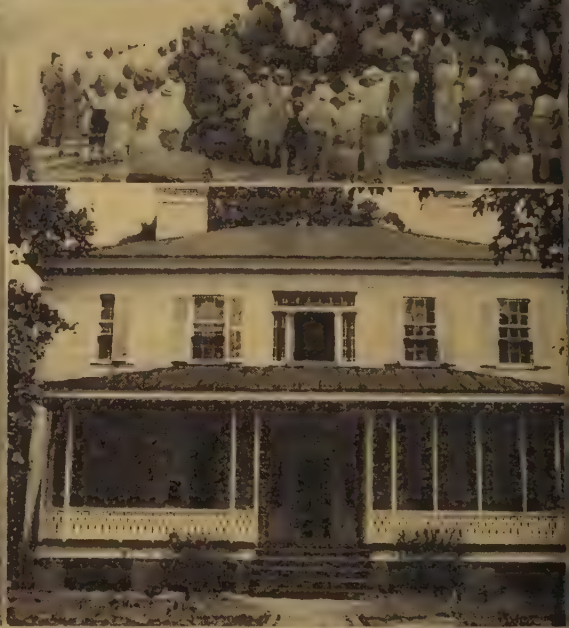
Proof of the popularity of soil conservation districts, it seems to me, is that now, 9 years after the establishment of your Brown Creek District, not a single district in the United States has revoked its charter, except for the one in Washington State where the farmers yielded to the request of the Government for war control of their lands for materials having to do with the development of atomic energy. Further evidence of how farmers feel toward districts is shown by the enlargement of 373 districts (July 1, 1946) through 551 separate petitions by surrounding farmers (adding a total of about 118,276,764 acres), and by the fact that they are still being formed at the rate of about 25 a month. Your own district has been enlarged to include Montgomery, Richmond, Union, and Stanley Counties. A number of States have been completely covered by districts; 87 percent of North Carolina is now covered, with petitions in from the western part of the State for the establishment of additional districts.

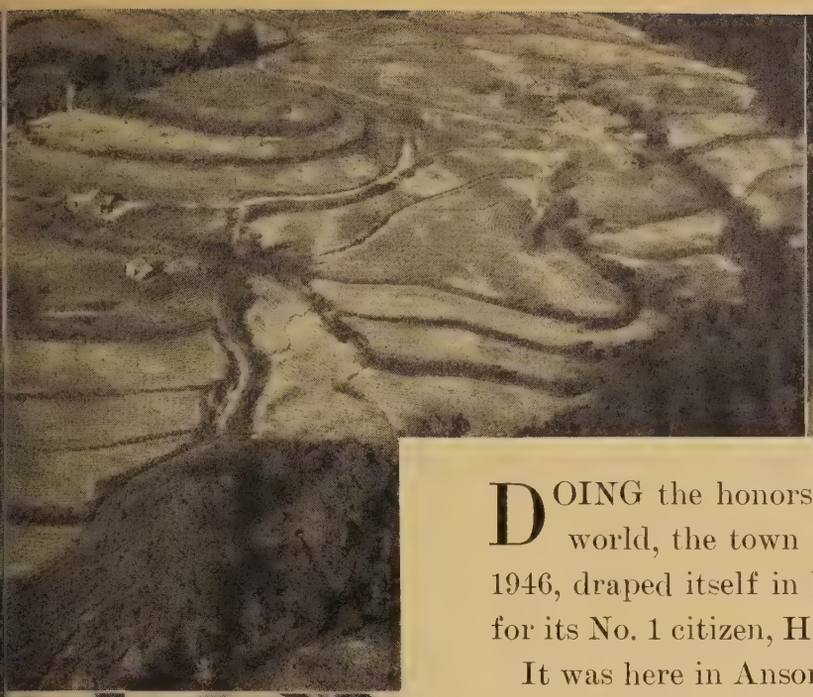
Back during the demonstrational period of the Service, some of us came to feel that soil conservation work could be speeded up by giving greater responsibility to farmers. It was further felt that inasmuch as farmers own and control the land needing conservation and must therefore have the final decision as to any work carried out on their own lands, they should direct the program. That is why—some of the reasons—the soil conservation district plan was conceived and developed. The soil conservation district is the most democratic organization of its kind ever devised.

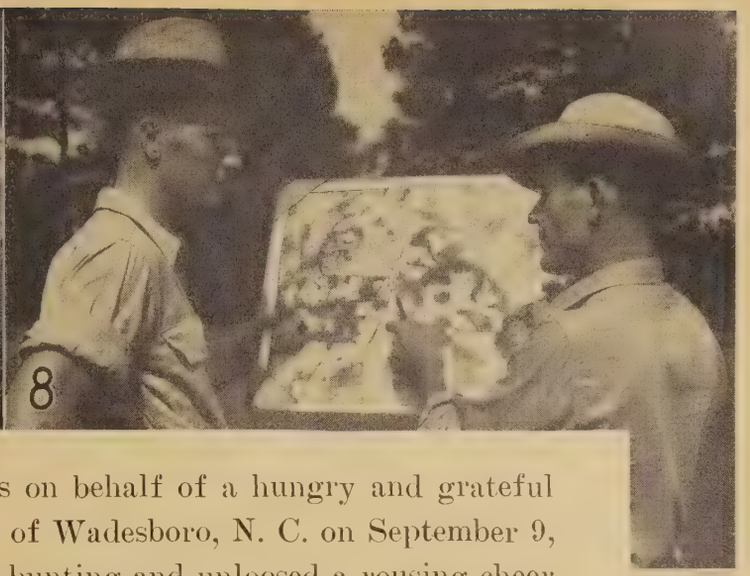
But any organization must have understanding leadership and direction. To be effective—to be successful—that leadership must be from within. Soil conservation districts have that kind of leadership through their supervisors or directors, appointed or elected from among farmers themselves. Thus, the soil conservation districts owe allegiance to no power, Federal or other; their supervisors are answerable only to the farmers of their own districts. They are on nobody's payroll. They receive no favors or special privileges. Their work in managing district affairs is entirely voluntary, and they spend much time at considerable personal sacrifice purely in the interest of the district program. I know, for example, of supervisors who during the war saved almost all their rationed passenger car gasoline and the thinning rubber on their tires to attend district board meetings and do other district work—for which they weren't reimbursed 1 penny.

(Continued on page 136)

Hugh Hammond Bennett
Conservation Day



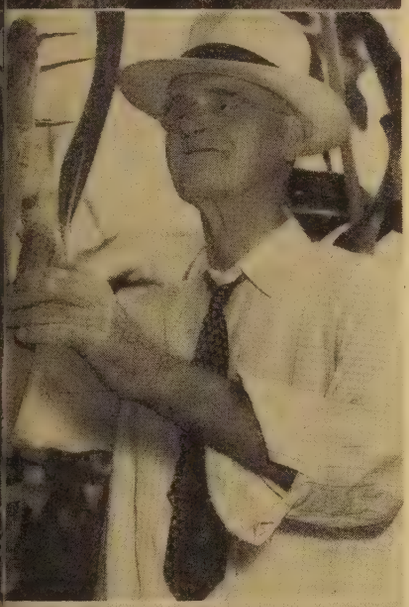


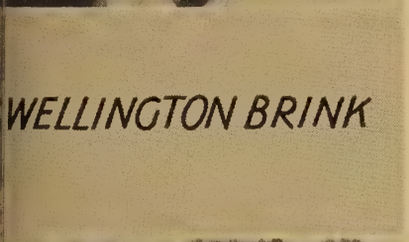


DOING the honors on behalf of a hungry and grateful world, the town of Wadesboro, N. C. on September 9, 1946, draped itself in bunting and unloosed a rousing cheer for its No. 1 citizen, Hugh Hammond Bennett.

It was here in Anson County that the modern program of soil conservation, now on a steady march around the globe, had its inception in the heart and mind of a farm lad of grit, gumption and imagination. Hugh Bennett, even as a barefoot youngster, was a determined rebel against soil ignorance and soil waste. He grew up to be the scientist, author, traveler, farmer, teacher, pamphleteer, strategist and leader around whom finally rallied the great American land army.

It was a long fight, a hard fight, and for many years virtually a single-handed fight. Depression, dust storms and

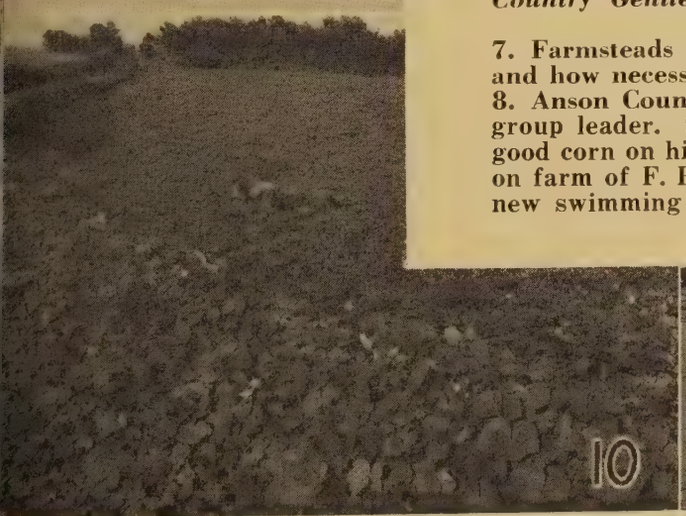


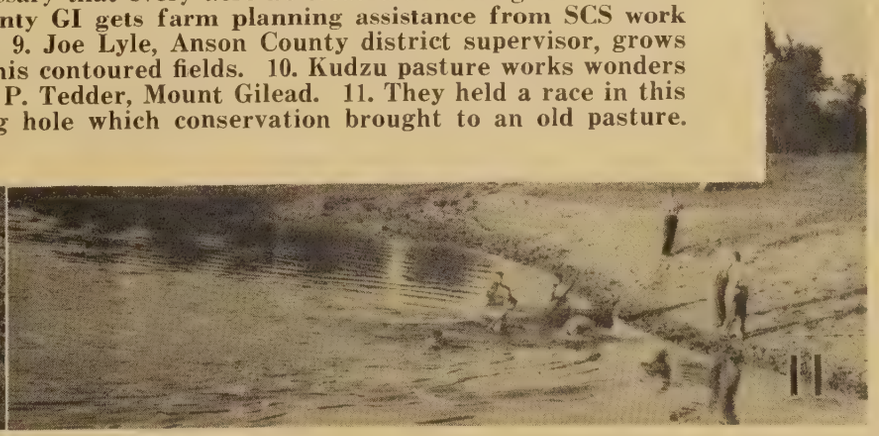


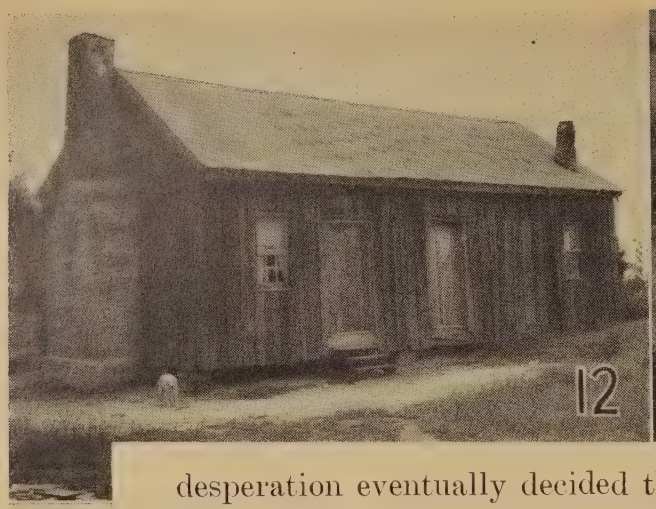
Hugh Bennett Day Pictures.—1. Boy Scouts sell tickets for barbecue. 2. "Welcome" and "Hail to the Chief"—and a key to the city to top it off! 3. They laugh, from the west: Mayor G. E. Andes, the honor guest, J. F. Allen, chairman of the County Board of Commissioners; H. P. Taylor, master of ceremonies. 4. Old Bennett home, where young Hugh lived.

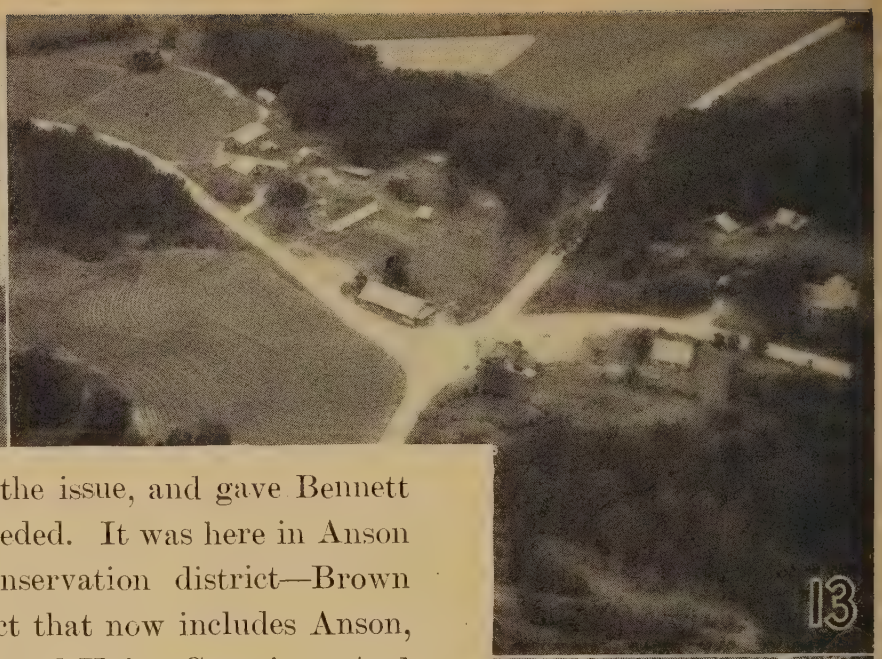
5. At the barbecue the connoisseur enjoys gen-u-wine Brown Creek snappin' turtle soup and hush-puppies. 6. Gentlemen of the press—Harvey Dinkins, farm editor *Winston-Salem Journal;* Francis Boleyn, *Wadesboro Messenger and Intelligencer;* Dr. Bennett, Channing Cope, columnist *Atlanta Constitution;* Jonathan Daniels, author, luncheon speaker, *Raleigh News and Observer;* Granbery Dickson, representing *Charlotte Observer,* and E. H. Taylor, associate editor *Country Gentleman.* Not shown is Burke Davis, *Charlotte News* feature writer.

7. Farmsteads near Wadesboro which show how terrible is erosion and how necessary that every acre be treated according to its needs. 8. Anson County GI gets farm planning assistance from SCS work group leader. 9. Joe Lyle, Anson County district supervisor, grows good corn on his contoured fields. 10. Kudzu pasture works wonders on farm of F. P. Tedder, Mount Gilead. 11. They held a race in this new swimming hole which conservation brought to an old pasture.









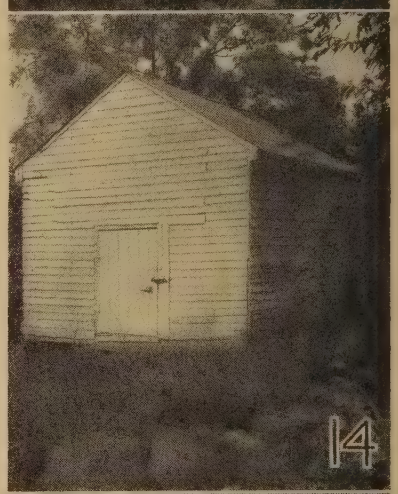
desperation eventually decided the issue, and gave Bennett the authority and support he needed. It was here in Anson County that the first soil conservation district—Brown Creek—got under way, a district that now includes Anson, Montgomery, Richmond, Stanly and Union Counties. And it was to Wadesboro that Hugh Bennett—the Man and his Ideas—returned to receive the acclaim of lifelong friends and neighbors.

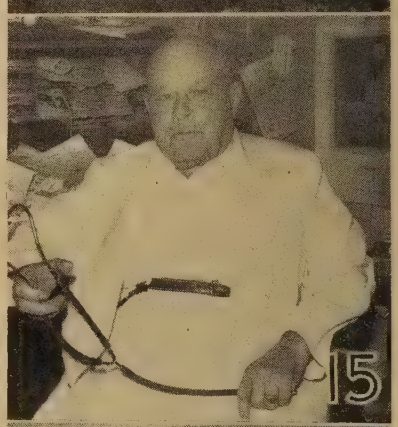
The Governor of the State, the Hon. R. Gregg Cherry, by special proclamation, designated September 9 as Hugh Hammond Bennett Conservation Day in North Carolina.

A 24-page lavishly illustrated booklet, dedicated to Bennett, was issued by the Brown Creek district in deference to the occasion. It was paid for by bankers of 13 different communities. It told the story of Hugh Bennett, and followed with the story of farming progress in the district under the Bennett methods of soil conservation.

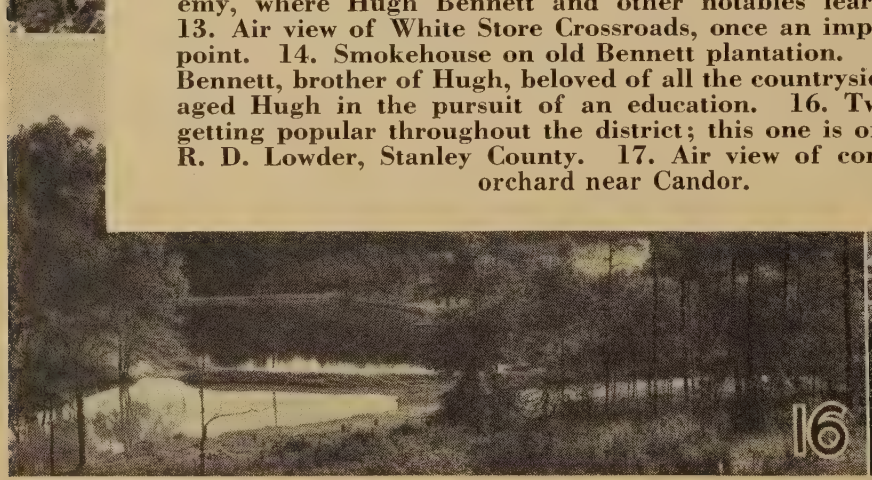
The Hon. Clinton P. Anderson, Secretary of Agriculture, wired greetings from "us who work with him."

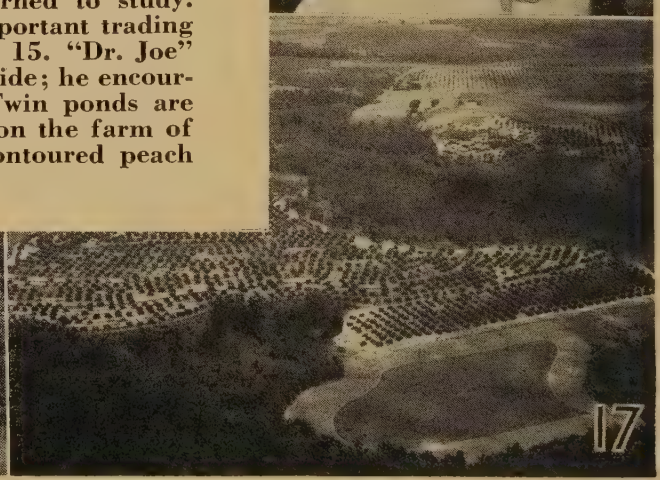
Wadesboro's board of commissioners joined in officialdom's flood of resolutions commending Bennett for his direction of the "Nation-wide program of soil erosion prevention and





More Bennett Day Pictures. 12. What's left of Gould's Fork Academy, where Hugh Bennett and other notables learned to study. 13. Air view of White Store Crossroads, once an important trading point. 14. Smokehouse on old Bennett plantation. 15. "Dr. Joe" Bennett, brother of Hugh, beloved of all the countryside; he encouraged Hugh in the pursuit of an education. 16. Twin ponds are getting popular throughout the district; this one is on the farm of R. D. Lowder, Stanley County. 17. Air view of contoured peach orchard near Candor.





control, and proper land use of such soundness that many other countries are following this example."

Anson County's board of commissioners sent its "cordial greeting and best wishes" to "the foremost authority on erosion and its prevention."

The superior court of Anson County adjourned "in honor and respect to the life and accomplishments of said Hugh Hammond Bennett."

From admirers in many parts of the country and from representatives of foreign countries, came messages of felicitation.

The celebration opened shortly before noon at the impressive pillared front of the courthouse, under a huge banner "Welcome Hugh," to the music of the high school band and the cheers of a large throng of townspeople and farmers from the surrounding countryside. Mayor G. E. Andes presented a 2-foot "key to the city" to the honored guest.

Principal speaker at an overflow luncheon meeting at a local hotel was Jonathan Daniels, famed author, journalist and former presidential secretary, who coupled Hugh Bennett with Thomas Wolfe as the two North Carolinians "who in our times have made the greatest impress on the mind of the world." The luncheon had as joint hosts the Civitan and Rotary clubs, with former State Senator H. P. Taylor as toastmaster. To Mrs. Bennett, "who has been at his side all these years as faithful counselor and partner," was presented an orchid. She was the only woman at the head table.

In the afternoon a 2-hour conducted tour was made of the Gould's Fork area so dear to the heart of Hugh as a youth. The purpose was dual—to savor old memories and to demonstrate the changes for the better that have been achieved through soil conservation. There were 18 stops along the way, with brief explanations of what has happened being made via the loud-speaker at the head of the motor cavalcade. The route included the birthplace of Hugh Bennett, the family school house, and Gould's Fork Academy. The aged Sim Bennett, son of a former slave and a minister among his people, eloquently recalled his family's long and happy association with Hugh Bennett and his "folks." On the agenda, too, were swimmin' hole and fish ponds—new and old, green swards where once stretched worn and weary cotton fields, new woods on what once were cultivated fields, and a mule race reminiscent of the days of yore.

Old family school known as "Polly House"; it stands back of plantation house on Bennett place.

Bennett's own address followed a barbecue in the evening at the country club—a festive occasion featuring old-time Brown Creek snapping-turtle soup. An over-capacity crowd attended and the meeting which followed the meal was necessarily held in the open air from the front steps.

Hugh Bennett was deeply touched by "this kind of expression by one's lifelong friends"—and he proceeded, as is his wont, to tell what's happening to the land not only in Anson County but all over the world! "At least 30 countries," said he, "are taking up our national pattern of soil conservation." But—and this too was in character—"We are not at all satisfied with present progress."

So, at long last, the prophet found honor in his own country. Hugh Hammond Bennett Conservation Day in North Carolina—now linked in local annals with the 1900 total eclipse of the sun as one of the two biggest days in Wadesboro history—brought the chief back to the old camping grounds on Brown Creek to view the effects of his healing on the wounded land of his boyhood.

DREAM COMING TRUE

(*Continued from page 131*)

All but about 5 States have 5 supervisors for each district, which means that more than 8,000 progressive farmers and ranchers, in something like two-thirds of the Nation's counties, are already unselfishly discharging the responsibilities of leadership in our great soil conservation program. With new soil conservation districts being voted in at the rapid rate they are at this time, the number of supervisory farmers will steadily increase until the country is covered with districts.

In addition, there are several thousand other farmers who have accepted appointment—on the same voluntary, unpaid basis—as "assistants" to the district supervisors, in local communities. Also, there are around 300 State soil conservation committee or board members—including farmers and various State agricultural officials—who likewise serve without renumeration in performing their duties with respect to State district affairs.

Probably never before in the history of this or any other country has there existed such a large and active body of volunteer, unpaid agricultural leaders as in this force of soil conservation district supervisors, directors, and other district officials. And district supervisors are organizing with a view to increasing their knowledge of conservation matters and improving their leadership accordingly. About 30 States already have associations of supervisors, and recently the National Association of Soil Conservation District Governing Officials was formally organized.

I think that soil conservation districts and soil conservation are here to stay.

Meanwhile, experience during the 9 years' time since soil conservation districts came onto the American agricultural scene shows that almost every farmer who adopts the planned, acre-by-acre soil conservation way of farming becomes himself a missionary for soil and water conservation. What a gratifying thing this democratic, "grass roots" leadership in soil conservation has become! What a tremendous force it is for the future prosperity of our American agriculture! I hardly need tell you that, personally, I'll not be content until that farm leadership, and the applied soil conservation it represents, has reached into every county in the United States, and to every acre of cropland, pasture land, farm woodland, and idle land. I pledge my continued, undivided efforts, and those of the Soil Conservation Service which I represent, in helping to bring this about.

The Soil Conservation Service and other Federal and State agencies furnish technical and other aids to the districts, on invitation. Otherwise, neither State nor Federal agencies have any rights or prerogatives of any kind whatsover in most of the districts.

We have learned here in the United States, finally, that we must have soil conservation if we are to have continuous, abundant agricultural production. And we have learned, too, that it must be efficient conservation—the kind that will keep land permanently productive. In turn, soil conservation requires intelligent use and maintenance of land resources. This may mean contour cultivation and terracing to hold soil and conserve rainfall. It may mean seeding grass or planting trees to meet the needs of bare, steep slopes or shallow soil. It may mean changing a rotation to increase soil productivity, and so on.

First of all, however, soil conservation requires a plan—a workable, practical lay-out of the farm, showing what the land is, what needs to be done, and what can be done in every field, pasture, woodlot, and piece of idle land on the entire farm. Such a plan is developed with a map of the farm that shows: (1) the location of the various soils, (2) the slope of the land, (3) the degree and extent of erosion, and (4) such features as fields and pastures, woodlands, streams, and gullies. Planning in this way for the development of soil conservation farming is like making a blueprint to guide the building of a house. It is basic to the safety of the land.

Through its Nation-wide program of work on the land in cooperation with soil conservation districts, the Soil Conservation Service has led in the technical development and application of new and improved measures for the control of erosion, conservation of rainfall, drainage, and improvement in land use. The Soil Conservation Service is essentially a corps of trained, experienced specialists in land, plants, animals, and land use, organized to work cooperatively with farmers out on their land. In addition, the Service carries on, in cooperation with the States, a research program for the development of new and better methods of conservation.

If there were some standardized, simple remedy for the ills of the land that could be applied indiscriminately, the job of soil conservation would be comparatively easy. But there is about as much variety in soil, in topography, in erosion, and in the performance of water and wind and plants, as in the highly complicated landscape of the country. Control methods that work wonders in cotton country may do more harm than good on the wheatlands of the Great Plains, where dust storms sometimes create havoc during protracted drought. Even on neighboring farms, and often in the same field, land problems are almost never completely identical. The specific land treatments used and recommended by Service technicians may therefore vary from one valley to the next, from farm to farm, and even from field to field. Before any work is done, each farm is carefully analyzed, both as a piece of land and as a business enterprise, to determine

productivity, needs, etc., based on the exact lay of the land, the quality of the soil, the degree of erosion damage, and the prevailing erosion hazards on every acre, and the work facilities and desires of the operator.

The next step is to work out with the farmer a plan for practical operation, based on the ground information acquired and translated into eight simple land-capability classes that nontechnical people can understand. This the soil conservation technicians do, not indoors around a table, but out in the fields, working along with the farmer himself, with all the pertinent facts at hand for full and understanding consideration on the immediate spot. They don't give the farmer a bulletin and say: "Read this and you can do the job yourself." They know the job cannot be done that way.

Drawing up a satisfactory land-use and land-protection plan for a farm is only part of the job; however, the main job is actual application of the plan to the land.

The completely coordinated and balanced farm program of the Service calls for the protection of all useful land on all the farms of the country. We fully understand that only a good beginning has been made on the whole soil and water conservation job. But all of us should derive much satisfaction from contrasting progress to date with what was being done before America woke up to the seriousness of the situation only a little while ago. What we pretty generally were doing, previously, was to sit idly by until nearly a fifth of the original area of tillable land in the United States was ruined for further immediate practical cultivation, with about a third of the remaining tillable area badly damaged. Further, more than half of our present area of cropland even now is subject to erosion. Considering crop and grazing lands together, no less than 282 million acres have been practically ruined or very badly damaged; and something like 775 million acres of crop, grazing, forest, and other lands have been eroded to some extent. All together, more than half of the farmland in the country has been damaged in some degree by erosion.

And we still are by no means free from the curse of the red-ink entries in our soil bank balance. About half a million acres are still being practically ruined each year. Even that is a real gain over the approximately 1 million acres a year it is estimated we were letting get away from our farmland capital each year for the period from about 1890 or '95 to 1930 or '35. This damage to our land, which is the source of our food, most of our clothing, and much of our housing materials, has been costing us nearly $4,000,000,000 a year. What a price to pay for the senseless privilege of careless land use! That appalling cost includes loss of plant food contained in the more than

Jerseys grazing on permanent pasture north of Wadesboro.

3 billion tons of farmland soil that has been washing or blowing away each year. It also includes such items as flood damage chargeable to the results of erosion; damage to roads and railroads, damage to streams, harbors, reservoirs, and ditches; and harm to wildlife, fisheries, etc. It does not take into acount, however, such items as lowered purchasing power, reduced railway traffic, narrowed tax base, and the development of rural slums.

Look what we find right here in North Carolina. Surveys have shown that soil erosion has ruined for further practical cultivation some 2,800,000 acres, while serious damage has been done to 9¼ million acres more of cropland and other kinds of land. That is to say, for every 3 acres of good cropland remaining in the State, 2 acres of land have been ruined or seriously affected by erosion. But we have made a good start at control in North Carolina— and there is enough good land left to take care of us if we take care of the land.

Reporting on their operations, 147 representative North Carolina farmers who kept books said they produced 28 percent more per acre of all major crops as a result of using conservation practices. That is an increase which, if extended to all the cropland of the State, would be the practical equivalent of adding around 2 million acres to our producing area.

Most satisfying, though, is the kind of production that resulted from this soil conservation farming. I mean such essentials to better living as an 85-percent increase in numbers of dairy cows and a 119–percent increase in beef cattle, 236 percent more hogs, and 186 percent more poultry. Why were they able to do this? It was because, instead of growing straight corn, grain, cotton, and the like, these farmers put part of their land into erosion-resistant pasture, hay, and other feed crops, under their conservation plans. That made it possible for them to feed more livestock and poultry.

At the same time, these farmers produced more cash crops on fewer acres with their conservation practices. They reported 6,000 more bushels of corn from 800 fewer acres and 179,000 more pounds of tobacco on about the same acreage. This is diversification—diversification on our North Carolina farms. All my life I have heard men plead for diversification and more livestock here in the South, even back to the time of the Farmers' Alliance. But it never came—not until right recently under the urge and momentum of the soil conservation movement.

I think something should be said as to what is being done on a State-wide basis in North Carolina. It is particularly gratifying that by the end of 1945 nearly 2 million acres had been given good conservation treatment. This work included, among other things more than half a million acres of crop rotation, about 280,000 acres terraced, 123,000 acres of pasture seeding; nearly 100,000 acres of woodland improvement, 18,000 acres of kudzu planting, 14,000 acres of tree planting, 10,000 acres of sericea, and 334 farm ponds installed.

But the big job is still ahead of us in North Carolina, as elsewhere. We have made good progress—remarkable progress, in fact—but we have a long way to go yet. That is why we made a Nation-wide conservation needs study some time back, to see just how big the job ahead really is.

We know how big it is; we know that nearly a billion acres of the country's farm and ranch land needs complete, planned conservation treatment. It is a job that wil take probably 20 years, at least, for getting the basic work done, if technical help, labor, machinery, and materials are available. Thereafter, of course, will be the continuing task of maintaining the conservation work. We also know, with dependable accuracy for all practical purposes, how much labor, machinery, and materials will be required to do the job. To my way of thinking, this is the only business-like way of going about the task, whether we are dealing with a single soil conservation district, one state, or the whole country.

Let's look at the conservation needs for North Carolina as originally estimated (some changes may have to be made in refining these estimates). You have seen them many times, probably, but there is no harm in refreshing our memory occasionally on so important a matter.

Our survey shows, for example, that out of 7¼ million acres of cropland here in North Carolina (1940 census), rotations are needed on 6 million acres, cover crops on more than 2 million acres, and strip cropping on 2¼ million acres. We still need better than 5 million acres of terracing, 9 million acres of improved cutting in woodlands, at least 42,000 farm ponds, and nearly 2½ million acres of fertilizing and liming of pastures. These are a few representative examples of what lies ahead. The total job of conservation work needed by North Carolina is estimated to require at least a quarter of a million man-years of skilled and unskilled labor (including technical assistance), plus more than 60,000 machinery-years of work, 28,000 tons of seed, and millions of trees, shrubs, and other plants. Terracing alone calls for nearly 28,000 man-years of labor, 5,573 horse-equipment years, and 4,000 tractor-equipment years.

It is our policy as already mentioned, to work on all kinds of land. This makes it necessary to work with all kinds of people—owners, operators, and tenants, of all races and creeds.

While looking the other day at the "show window" conservation job now under way in Person County, N. C. where it is planned to treat for soil conservation all of the 54 farms along Highway 501 from the Virginia line down to Roxboro, I had an interesting talk with a tenant farmer, Mr. J. R. Wade. Of the many things discussed, I was struck by Mr. Wade's feeling toward his conservation farm plan, which included a colored map showing the capabilities of the land he is farming. He said:

"When I started into this conservation program, I didn't know I was going to get any such thing as a detailed plan of every acre of the land I farm, supported as it is by a map which accurately shows the different kinds of land I am cultivating. This alone is worth entering into a cooperative agreement with the district, even if I hadn't been getting good results from the conservation measures that already have been applied to my land."

Mr. Wade expressed the opinion that many tenant farmers waste time and hurt a lot of land moving each year in search of something they seldom find—a better farm with better land.

"If they would cooperate more with their landlords and build up the productiveness of the soil where they are, they would get along much better, and so would the land," he said. "This soil conservation work you people have started offers the best solution of the 1-year tenant problem that we have."

Before closing, I want to mention what I saw along Highway 74 going from Peachland to Monroe on August 11, for the entire distance. This section, which I can remember as one of only fairly good farming operations and considerable soil erosion, has been revolutionized. That whole distance of about 15 miles is pretty largely farmed; and all of it, every acre I looked at on both sides of the road, as far as I could see, has been effectively treated for soil conservation. Fields not under cultivated crops were

covered with luxuriant stands of lespedeza. It was more than a beautiful sight; it was inspiring, something I never expected to see.

There are other areas of this kind throughout the South, some of which I saw on the same trip, and others I didn't see; but here is one I can particularly recommend to your attention.

The area of good cropland is shrinking everywhere, while population grows. The day will come when the combination of productive land and water will rank second only to people as the most important of all resources. Meanwhile, conservationists must carry on unfailingly in their efforts to stop erosion. Time is getting shorter. Those who would thwart the progress of conservation, for whatever purpose, are in this day and age the enemies of mankind. They should be promptly discredited.

There is no second choice; we must maintain an adequate area of productive land. That is an area—here and throughout the nations of the earth—which will be sufficient to produce at least a minimum nutritional diet for the populations of this and other countries. This is the least that common sense—and self preservation—requires. How will this be done? Is there an alternative to the kind of soil conservation program I have described?

I know of only two: One is outright and absolute Government regulation of the use and treatment of all lands; another is despicable abandonment of hope. Which of these three do you prefer?

"If You Fail, We Slump"

(Remarks by Sim Bennett, a local farmer and preacher, at the Bennett plantation on Gould's Fork Creek, N. C., during a stop of the tour on Hugh Bennett Day)

MY FATHER (John Bennett, an ex-slave) moved here on the Bennett place in the spring of 1872, and I lived here with my folks until I was 26. I thought there was no place like home and think so yet. Because under the conditions prevailing in those days, "The Boss"—W. O. Bennett (father of Hugh Bennett)—as we all called him—and the whole family was very good to us. The Boss helped see to us going to school—such schools as we had then, sometimes running 2 months during the year and some years there were no schools. After a while the school terms increased and about that time I had gotten above free school age, but I still wanted to go some more. So I carried my wishes to the Boss, as we often did on the plantation. I'll never forget what he said. "Sim, you go out there and see if the teacher will teach you and let you hear some of his classes." It worked out O. K., and so I went to school some more.

I lived with Dr. J. H. Bennett, brother of Dr. Hugh H. Bennett, after I was married, for 37 years.

Out here on this plantation where you and your brothers and sisters, and all of us, were raised, people didn't tell lies. At one time I didn't think a white man would tell an untruth. But once in town, I heard a white man tell an untruth, and it bothered me. But I learned by that that there are different kinds of people in the world.

Sim Bennett.

I never heard the Boss use a curse word all my life, unless you would call "Golly me" one. And now I am glad to see and look at Mr. Hugh again to know that he is taking on this big, tough job known as soil conservation and erosion control. It is far more important at this time than shooting at the moon, as the papers have been talking about lately. I'll assure you, Mr. Hugh, that we, your comrades, will stand by you, for if you fail, we slump.

Hugh Hammond Bennett

Introductory note in booklet issued by Brown Creek Soil Conservation District

WE ARE PROUD that Hugh Bennett is one of us. He came from a farm in Anson County, one of the five counties in our soil conservation district. He came from a pioneer family which has given many leaders to the community—leaders whose influence spreads to State and national affairs.

Hugh Bennett is known wherever hoe scratches earth. His fame as a land doctor extends to all the continents and to many of the islands of the sea. His science, and his leadership, are invoked wherever man struggles against wind and rain and flood.

In the course of his long battle against erosion, Hugh Bennett worked in nearly every county in the United States. A year or two ago, he flew to lend his help to the Union of South Africa. Years before the Matanuska Valley reached our front pages, Dr. Bennett was up there, with a pack on his back, exploring the agricultural possibilities of the Far North. He spent several years—valuable, exciting years—in the Canal Zone and the jungles of the upper Amazon. His findings in Cuba virtually revolutionized the sugar industry there.

Eventually, because he had experience and scientific knowledge and courage, Hugh Bennett was called upon to lick a great "national menace"—soil erosion. In tackling the assignment, he quickly laid the basis for the Nation's great soil conservation program. His was the guiding hand in the development of the spectacular early demonstrations and research, the complete farm conservation plan, and the typing of land according to use-capabilities.

From the beginning, Hugh Bennett urged that farmers be the leaders in soil conservation, because they owned and farmed the lands on which all of us depend. Soil conservation districts, formed and run by farmers, sprang from this idea. Our Brown Creek District was the first of these districts in the Nation.

Hugh Bennett traveled. But he never traveled so far or so fast as to shake from his shoes the mud of Brown Creek. He is one with the land of the Tarheel. A club woman, confused as to names, once referred to him as "that interesting speaker, Mr. Clay!" Congressional committees know him as a unique Washington administrator who talks farmer-language while explaining soil conservation in terms of specialized machinery or lespedeza bicolor honey which he lugs to the hearings.

Hugh Bennett, versatile as he is, finds that he can't be in Washington and Johanesburg and Wadesboro at the same time; therefore, he writes and speaks, uses press and radio and motion pictures, to amplify his thunder. Recognized authority at home and abroad is his monumental 1,000-page "Soil Conservation," a reference book which states the problems, program, science, and technique of soil conservation. Laboring far into the nights, he has produced a sizeable array of other books, articles for national magazines, contributions to scientific journals. Hugh Bennett is a good psychologist. He violates all or most of the rules of public speaking—concentrates on his message. And as genial, forthright Hugh Bennett—with no attempt to be otherwise—he does a little better than all right.

Many other lands are copying Dr. Bennett's Soil Conservation Service. Visitors flock to his office for counsel from the far corners of the world. Honors heap on the man who for many years was a solitary figure crying in the wilderness, warning of soil losses when few would listen. A tired, worried humanity today pays homage to the man who has shown how to save the common heritage of soil and at the same time add materially to its productiveness.

Hugh Bennett is unchanged by all this. He is much more interested in the soil than public acclaim—much more interested in the soil, and in people, and in robust eating. Having sampled, and enjoyed, the choicest victuals of many lands, he is more than ever convinced that food—the harvest of a good stewardship—is important to world peace. "When nations eat," Dr. Bennett says, "they are less likely to pick a fight."

Yes, we are proud that Hugh Bennett is one of us. As supervisors of the first soil conservation district in the Nation, we are pleased to dedicate this booklet about our own soil conservation program to the world's leading expert on soil conservation and wise land use, Hugh Hammond Bennett.

Resolution

Board of Commissioners

WHEREAS: Civilization on earth depends upon the thin surface layer of topsoil:

AND WHEREAS: The topsoil in America has been wasted at a rate never before experienced anywhere in the world:

AND WHEREAS: Excessive erosion is due mainly to carelessness and a lack of information as to feasible means of prevention:

AND WHEREAS: Hugh Hammond Bennett, reared in Anson County, and now Chief of the United States Soil Conservation Service, has become the foremost authority on erosion and its prevention; has developed means for conservation of soil and moisture, not only at low cost, but when carefully followed, may be expected to produce greater profit from farming:

AND WHEREAS: The first soil conservation district to be formed anywhere, to apply the Bennett principles of conservation, was established here in Anson County:

THEREFORE BE IT RESOLVED: 1. That the Board of County Commissioners of Anson County, convened in regular session on this the First Monday in September, 1946, extends to Dr. Hugh Hammond Bennett cordial greetings and best wishes on the occasion of the proposed celebration by his home people during the present month;

2. That the board, in its official capacity, and as representative of the citizens of Anson County, recognizes a deep sense of obligation to Dr. Bennett for his achievements; that it is the sense of this board that every man, woman and child, not only in Anson County, but everywhere, and future generations will eventually live happier and more prosperous lives by reason of his labors and the work of the organization known as Soil Conservation Service, which he has been primarily instrumental in having established, and which he has directed since its inception:

AND BE IT FURTHER RESOLVED: That the board commends the members of the board of supervisors of the Brown Creek Soil Conservation District for having decided to pay honor to this distinguished native son on "Hugh Hammond Bennett Soil Conservation Day," in Wadesboro, September 9, 1946;

AND BE IT FURTHER RESOLVED: That this resolution be spread upon the minutes of the board, and a copy thereof prepared and presented to Dr. Bennett.

I, Francis E. Liles, clerk of the board of commissioners of Anson County, N. C., do hereby certify that the foregoing is a true copy of a resolution adopted by the board of commissioners of Anson County in regular session on Monday, September 2, 1946, and in testimony thereof I do hereunto set my hand and official seal of office.

[SEAL] (Signed) FRANCIS E. LILES,
Clerk to the Board of Commissioners of Anson County, N. C.

WHITEMAN FARM

(*Continued from page 124*)

most suitable use is fully as important as strip cropping, terracing, proper liming, manuring, and fertilizing. Since his herd of Aberdeen-Angus numbers 85, manure is plentiful. He plows in 20 tons to the acre, limes to test, and applies 500 pounds of 5–10–10 fertilizer.

"I don't claim that holding the soil on the farm is the cure-all for low yields," said Mr. Whiteman, "but I don't see how anybody can expect to farm efficiently if he's satisfied to put fertilizer, manure, and lime on his fields and then have the stuff wash away every time it rains with any force."

He's satisfied that his strips and diversion terraces are holding his soil and plant foods on the

(*Continued on page 143*)

"The Hope of the Garden Is Not Gone"

Address by Jonathan Daniels, author, journalist, and former Presidential secretary, at joint Civitan-Rotary luncheon, Wadesboro, N. C., on Hugh Bennett Conservation Day

ANSON COUNTY has quite a job today. This celebration seems to me not only a homecoming but an argument. By a strange coincidence, I think, the two North Carolinians who in our times have made the greatest impress on the mind of the world have joined in the expressed faith that a man cannot come home again. Thomas Wolfe, the greatest writer the State has produced, left behind when he died a great novel called "You Can't Go Home Again." And before Wolfe wrote his book, Hugh Bennett, who has always seemed to me at least as much a poet as a soil scientist, said very much the same thing.

"There is really no such thing," he said, "as returning to the places and people you remember from your youth. It is a disquieting experience. You realize that on this old earth with its endless changing processes we are all transient visitors; and you begin to count your score."

"Even in my time," he said here in Anson County once, "this part of the country has changed. The old swimming holes I remember have fallen away to little shallow red mud puddles. The lines of the hills, the entire landscape has changed. Many a field you and I remember in virgin woods or thick grass has been cottoned out and gutted. We men who have allowed this soil to be swept from under us and from under our children at such a bewildering rate have a good deal to answer for. We didn't know any better. But we do now."

I am not entirely sure about that. Of course, we can all see the defenses Hugh Bennett and his men have built across America against the loss of our soil. As neighbors we have watched the creative as well as the defensive aspects of Hugh Bennett's work. In wartime we were fed from acres which, when Hugh Bennett began as chief of the Soil Conservation Service, were producing only dust storms for dark skies. But many people who think that Hugh Bennett's science is a mere matter of water and wind, soil and plows have only the slightest understanding of the meaning of Hugh Bennett the man. What he discovered was the carelessness and blindness of man. Men had seen gullies before him. Children can see them.

I can't think of an easier county to come happily home to than Anson. It keeps the good qualities upon which homesickness thrives. Also you remember that the Pee Dee River which runs along its border, was first considered by Stephen Foster when he searched the map for a two-syllable southern river about which to make a song of homesickness. The Pee Dee is our Suwannee still. And I can't think of a man who could more easily come home than Hugh Bennett. I have seen the regard with which he is held in the Nation and the world. But you and I have also seen the man. Frankly, he still looks to me like a man who might still be plowing those acres he gutted out when he was too young to know better. Certainly no sheet erosion or anything else has washed the sense of the Anson soil from his spirit. The tar still sticks to his heels.

And I can testify he can be eager about homecoming. I remember seeing him in Washington in wartime just after he had come home from South Africa. I paid the check for our luncheon in the Willard Hotel and I can testify he had not lost his Anson County appetite. Also, I can testify that he had put on no pretensions in Washington or the world. He had just come back from many thousands of miles by Army bomber. He had been, he said, scared only once and that was all the time. He returned with a distinct dislike for the South African spitting cobras whom he had met in his soil studies there. And he also returned with a tragic story of the manner in which the South Africa, which has always seemed to us as rich as diamonds from Kimberly and gold from the Transvaal, was becoming swiftly and almost desperately impoverished by the erosion of its soils.

I was interested in Hugh Bennett's report then not merely as one of his neighbors and chief admirers but because my boss then, Franklin D. Roosevelt, even in the midst of war was already thinking about Hugh Bennett's teachings as a part of a plan for peace for the world which he believed must contain plenty if it could ever hope for security. You remember that the acceptance of Hugh Bennett's discoveries (which for 20 years

had been scoffed at) was one of the items in Roosevelt's program for America. The extension of that work was a part of Roosevelt's purposes for the world.

I for one always remember Hugh Bennett when I think of FDR's statement immediately after Pearl Harbor when he promised implacable retribution but added: "The true goal we seek is far above and beyond the ugly field of battle. When we resort to force, as now we must, we are determined that the force shall be directed toward ultimate good as well as immediate evil. We Americans are not destroyers, we are builders * * *

There is a tragic possibility that Roosevelt may have been mistaken about Americans as builders and not destroyers. Long before the atomic scientists, Hugh Bennett who showed us how to build also brought us face to face with the tragic results of our own destructiveness. * * * It is perhaps the greatest mark of the genius of Hugh Bennett that we honor him because he has indicated us as a nation of destroyers—careless, greedy, in a hurry—and has still kept not only a nation's respect but its affection, too.

Perhaps that destructiveness as Hugh Bennett showed it to us—in the changing lines of the hills of Anson, in the encroaching desert where the West's green grass had been, even in the dust storms—may seem now very tame stuff beside the powers to destroy we have deliberately and scientifically developed in our times. I am not sure. But I am sure that not even the atomic bomb is more terrifying than Hugh Bennett's discovery that under our ignorance and complacency the substance of our land could disappear without our awareness. In that sheet erosion which unseen can strip our fattest fields, I think Hugh Bennett, as the poet and philosopher as well as scientist, has taught us from the simple simile of soil that the same thing can happen to our hopes.

Anson could never have chosen a more important time to welcome Hugh Bennett home. It was Hugh Bennett who gave Roosevelt and America the sharply telling phrase, "human erosion." What happened to the land happened also to the people upon it. But in our times the danger spreads—and swiftly. Like sheet erosion it is not always easy to see it. Already the hopes of a creative peace in the world and a productive peace at home seem worn if not gullied. * * *

This earth and its promises are ours. And upon it we shall measure ourselves and our future. The good earth is hacked but not lost. The hope of the garden is not gone. But suddenly—very suddenly—in surprise and chagrin, we could face desert where we hoped to behold fulfillment of our dreams. Blindness is not restricted to agriculture. Indeed, they are blind who see what Hugh Bennett has taught us only in our fields. He has been talking and teaching not about our soils but ourselves. We need to contemplate not only our old fields but our old fears.

I am happy to join Anson in welcoming Hugh Bennett home. But I have a hunch that in more ways than one, the coming and the welcoming ought to be reversed. Sometimes, even when we are there, home still seems far, far away. And nobody has shown us the way to its meaning and keeping better than Hugh Bennett. He has looked at folly, stubbornness, ignorance and destruction without losing heart. He has taught us to build steadily in good will to new hope. We welcome such a man home. We would be happy men if with confidence we could hail such a spirit in our world.

WHITEMAN FARM

(*Continued from page 141*)

field. He'll tell you how the creek which drains on his farm runs clear now. He'd rather not talk about how it looked before he started his conservation plan.

According to B. E. Corey, his farm manager, who has been farming, man and boy, since 1907, Whiteman is the hardest working farm owner he's ever seen. When he comes in from his job as musical director of the American Broadcasting Company to spend three days on the farm he really works, says Corey, citing as evidence the 54 pounds he lost last spring, plowing, baling, and managing his cattle.

Whiteman, who spent a good part of his boyhood on his father's ranch outside of Denver, Colo., plans eventually to retire full-time to his farm. His herd includes stock with some of the best blood lines in Aberdeen-Angus records. His main bull, Bandoleer of Anoke XIII, springs from two of the finest lines in history—Blackbird and Blackcap. One of his heifers last year took a first place at the New Jersey State Fair. His young breeding stock has been bringing an average of $500 each. He sells his inferior stock for beef and veal.

Next time you hear the master producing sweet music over the air, think of him also as a dirt farmer who believes there's only one way to farm—the conservation way.

Mud-slinging for constructive ends. This big blast opened a tributary to drain into the Pocomoke. See the article "After 100 years," page 125.

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February 1947

In this issue —
AN IMPORTANT ARTICLE ON THE SOUTH'S NEW WINTER COVER CROP— *BLUE LUPINE*

SOIL CONSERVATION

OFFICIAL ORGAN OF THE SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

SOIL CONSERVATION

CLINTON P. ANDERSON
SECRETARY OF AGRICULTURE

HUGH H. BENNETT
CHIEF, SOIL CONSERVATION SERVICE

ISSUED MONTHLY BY SOIL CONSERVATION SERVICE, U. S. DEPT. OF AGRICULTURE, WASHINGTON, D. C.
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WELLINGTON BRINK, EDITOR

CONTENTS

Front Cover: Miss Leverne Bowen in blue lupine on F. B. Calhoun Farm, Pinehurst, Ga.

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Land Values in Relation to Soil Conservation

By E. C. Weitzell

IT IS GENERALLY recognized that the "land boom" following World War I played an important role in the neglect and exploitation of soil resources during subsequent years. Lower prices for farm products found farmers with excessive debt burdens, which had to be paid from only a fraction of the income necessary to justify 1919 values. The resulting financial distress and widespread mortgage foreclosures are well known. In the effort to retain farms and homes, farmers who saddled themselves with inflated mortgages had no alternative to the exploitation of soil resources. The long-time neglect of resource conservation as a result of the "deplete and move on" philosophy was extended and enforced by thepreference of immediate consumption. It is scarcely necessary to remind anyone of the condition of soil resources by 1933.

Nonfarmers who purchased farm lands were no more fortunate. Lower incomes encouraged them to "squeeze" tenants and croppers, and to provide a bare minimum of operating capital. As a result, soil resources generally were neglected.

This situation added to the wide neglect of soil resources, and gave rise to the need for subsidies and technical guidance. Too often people forget that society has a stake in any situation which affects the future sources of food, fiber, and raw materials. The individual farmer and his family do not stand alone in this respect. Thus, it is important for everyone to realize the need during the next few years to guard against a recurrence of land inflation with its consequent neglect of soil conservation.

Land values are again on the way toward the 1919–20 peak (see table 1), as seen in the 83-percent increase over the 1935–39 average. Whether values generally will reach the World War I peak is still undetermined. But it is worth noting that current farm real-estate values in the East South Central and Pacific States are already considerably above the 1920 high. It is true that considerable caution is being exhibited in the North Central States, but even in these areas a gradual advance in land transfer prices is in process. The Southeastern States include some of our most severe conservation problems, yet this region is now experiencing the greatest increase in land values.

Most authorities are warning against the continuation of soil erosion and depletion that has occurred during the last 5 war years. Even though incomes have been high, the scarcity of labor, machinery, and fertilizers has deterred the maintenance of desirable levels of fertility and has slowed the progress of establishing soil conservation measures. The question is: Will this continue? If resources are not protected, and "repaired," during this period of high incomes, the pressures against conservation may be a distinct handicap at lower income levels than currently prevail. High land capitalization will greatly intensify this problem.

IT SHOULD BE RECOGNIZED that recent high incomes may not be net, but may consist partially of liquidated capital assets. To the extent that this is true, a part of current incomes should be earmarked as a reserve fund for establishing conservation systems of land management and for replacing depleted resources just as soon as technical help, essential fertilizers, and other soil amendments are available. The repair of buildings and the replacement of machinery are essential complementary resources that should be kept in good condition. Farmers sometimes neglect the maintenance of presently owned resources in favor of more land just as soon as they have a little capital available. In many instances they might be better off by maintaining a smaller acreage at a reasonably high level of productivity and repair, rather than by burdening themselves with mortgage debt and a much larger job of conservation. This is true particularly when the outlook is for substantially lower prices than those which give rise to the inflated "values" now paid for land.

According to available information, net farm incomes (parity ratio) were higher than ever be-

NOTE.—The author is an agricultural economist, division of land economics, Bureau of Agricultural Economics, Washington, D. C.

fore. The November parity ratio of 124 is 40 points above the 1935–39 average. This is a strong stimulus to higher farm values, and it could be the basis for an extremely disastrous farm land boom, unless everyone puts on the brakes. When looking at the November farm price index of 263, table 1, we need only to glance at the 1932 index of 68 to imagine what this all means. The November 1 land value index of 152, in all probability, already includes a considerable amount of overcapitalization in terms of long-run conservation values.

TABLE 1.—*Trend in land values, farm prices, and farm costs, United States*

[1910–14=100]

Item	1910–14 base	Index, 1919–20 peak	1932–33 bottom	1946 July
Land values [1]	100	170	73	152
Prices received [2]	100	211	68	263
Costs paid [2]	100	202	120	212

[1] For land values, 1912–14=100 *see The Farm Real Estate Situation, 1944–45*, U. S. Dept. of Agriculture, Cir. 743, 1945, and *Current Developments in the Farm Real Estate Market*, U. S. Department of Agriculture. December 1946.
[2] *Agricultural Statistics*, U. S. Department of Agriculture, 1942, pp. 647–8; and *Agricultural Prices*, U. S. Department of Agriculture, November 1946. (The "costs paid" index is for commodities purchased by farmers.)

More than half of all land transfers in recent months have been entirely for cash. To the extent that this is true the burden of debt will not be a conservation problem. However, landlords are prone to crowd production for a certain level of earnings when incomes are low. They are reluctant to return needed capital for maintaining soil resources. Since 36 percent of all buyers of farm land during the last year were reported to be nonfarmers, this is an important consideration.

The activity of the farm real estate market is indicated by the fact that approximately 55 farms per 1,000 changed hands during the year ending March 1, 1946, contrasted to 34 per 1,000 in 1941. During this 5-year period, the total amount of farm mortgage debt was reduced from $6,534 million to $5,080 million, or about 22 percent. This is encouraging. But accompanying this, is an increase in the amount of new mortgages held by private lenders in the amount of $95 million. This probably means a reduction in the length of repayment periods, inasmuch as private lenders usually provide shorter terms than do federally sponsored credit agencies. Together with higher values, short-term mortgages may mean greater pressure on land resources because of the higher annual payments, depending on the amount of the purchase price encumbered by mortgage.

All of these conditions add up to an over-all picture which may not be conducive to soil conservation. Expansion in these negative factors during the next year would produce a serious situation in this respect. This prospect causes one to inquire as to whether it would not be desirable for farmers to intensify their efforts to build and protect resource productivity now, when farm incomes are relatively high. This depends on the real purchasing power of current incomes in terms of present and future costs. It may be observed that the purchasing power of farm prices (received) in relation to prices paid for essential items of conservation is more favorable now than it has been since 1920. To the extent that farmers do not need to employ additional labor and machinery in order to install conservation practices, this current advantage is considerably greater.

How long farm prices will remain at present levels it is not possible to forecast. All that safely may be said is that they will go down, and the time may not be far off. In any event, it is not possible to foresee long-sustained farm incomes high enough to justify current land values. Unless land can be obtained at a price consistent with long-run probable earnings, it is almost sure to be a burdensome investment.

If we take a look at the history of farm prices up to November 1946, table 2, the unusually high current prices stand out. In terms of the long-run situation, however, the "possible 1950" prices are more significant. This projection of possible 1950 prices is based on the assumption of full employment, and as such is exceedingly liberal. The disparity between current and possible future prices, in general, is illustrated by the 103-point difference in the all-commodity farm price index. From the standpoint of long-run land values and the possibilities for a reasonable level of soil conservation, it is likely that the estimated 1950 prices are the maximum that can be hoped for.

The farm production picture forming the setting for the present land value situation is the result of wartime demands. Gross agricultural production was advanced 24 percent in 1944, from the 1935–39 base years (see U. S. D. A. Miscellaneous Publication No. 595, p. 5). In general, this expansion in output was not achieved by farming more land, but by increasing the yields of land already being farmed. Higher yielding varieties of grain, soil and water conservation, mechanization, and other technological developments have

led to unprecedented production of both crops and livestock.

Wartime needs created the temporary demands, and since the termination of hostilities the provision of relief and rehabilitation has absorbed vast quantities of farm products. In addition, the greatest purchasing power that our people have ever known is currently adding to the demand for food, fiber, and oil crops. And there is no indication that the limitations of physical production have been reached.

At the same time, the best estimates that can be made give no hope for a continuation of the present demand for farm products. The only hope for retaining a substantial amount of the current demand rests in the possibility for the creation of a virile and favorable world trade. The obstacles to favorable foreign trade are many. Among them are the lack of purchasing power at the disposal of those countries which might be consumers of our domestic surpluses, and the fact that a large number of the products that might be imported would be in direct competition with domestic production. These are only a few of the considerations that must be reckoned with when looking toward the future of land values. The same factors form the basis for the possibilities expressed at the "1950 bench-mark" prices given in table 2.

A reduction in demand and farm prices is not followed directly by reduced production. Farmers continue to produce, even though they may neglect conservation to do so. Unless they can cut overhead expenses, they have no acceptable alternative, as long as they can make any return to fixed costs, above their current or variable costs. This illustrates the close relationship between farm prices, including land values, and the possibility for adequate resource conservation. At least to the extent that conservation is dependent on the purchase of maintenance items, farm income is an extremely important factor. Any burden on income reduces the feasibility of providing the essential elements of productivity maintenance.

TABLE 2.—*Trend in farm commodity prices in the United States*

Selected commodities	Prices received by farmers [1]				
	1914	1919	1932	November 1946	Possible 1950 [2]
Cotton (lb.)	$0.07	$0.35	$0.06	$0.29	$0.13
Tobacco (lb.)	0.10	0.31	0.10	0.44	0.34
Wheat (bu.)	0.97	2.16	0.38	1.89	1.10
Corn (bu.)	0.71	1.51	0.32	1.27	0.90
Beef (cwt.)			4.25	17.60	10.25
Pork (cwt.)			3.34	22.80	11.25
Milk (cwt.)			1.27	5.00	3.10
All commodities [3]	101	213	65	263	160

[1] *Agricultural Statistics*, U. S. Department of Agriculture, 1942; and *Agricultural Prices*, U. S. Department of Agriculture, November 1946.
[2] Estimated as postwar "benchmark," in terms of full employment. See *Peacetime Adjustments in Farming*, U. S. Department of Agriculture, Misc. Pub. 595, 1945.
[3] Index, 1910-14=100.

Many people do not stop to consider fully the implications of inflated land values in terms of future earning and paying ability. For example, let us assume that a farmer buys a farm at a price of $22,000, on the basis of current farm prices. He makes a down payment of $2,000 and gives a mortgage for the remaining $20,000, which is contracted to be paid in 20 equal annual installments, at 4 percent interest. Thus, the total cost of the mortgage (capital and interest) is $29,432, or a little more than $1,471 per annual payment. It may be supposed, further, that this is the maximum annual payment that could be made in view of other obligations, including soil conservation.

It has already been noted that the most favorable expectations lead to the conclusion that farm prices may fall at least 35 percent. Considering the fact that farm costs never fall to the extent that prices received do, this price reduction would normally mean a much greater reduction in net income. But for purposes of illustration it may be assured that costs are reduced proportionately, and that net income is decreased 35 percent.

Then, instead of a value of $22,000, the reduced net income capitalized at 4 percent is $14,300. Moreover, the farmer's ability to pay has been reduced 35 percent; and the new level of income will justify annual amortization payments of only $1,006, instead of the annual payments of $1,471 that were previously contracted.

What does the farmer do now? There are several alternatives: He may reduce his level of living, cancel life-insurance policies, default on nonfarm financial obligations, exploit the land in an effort to keep his home, or he may default on the mortgage payments and lose his farm and home. The usual tendency, under circumstances of this character, is to neglect the conservation of land resources, first of all, in an effort to hold on. However, this often proves to be the wrong approach, because as resources are depleted, the ability to pay continually decreases. Before long the resources from which a part of the debt might have been

(*Continued on page 162*)

CASON J. CALLAWAY feels very keenly that the great majority of Georgia's farms can be made better places to live on.

Callaway developed this conviction some years ago. But at the time various people were keeping him too busy in the cotton industry to do anything toward proving it. At 24 he was elected to what turned out to be an 18-year hitch as president and chairman of the board of directors of Callaway Mills, at LaGrange, Ga. Along with this went terms as president of the American Cotton Manufacturers Association and the Cotton Manufacturers Association of Georgia.

But if Callaway had to shelve his idea, he didn't forget it. Ten years ago—at 42—he decided that he'd been in the cotton business long enough. He wanted to farm, to get to work on that idea of his. And he did—with characteristic thoroughness. He moved out to LaGrange to the 31,000 acres of eroded and worn-out rolling Piedmont land he'd bought in Piedmont section—Harris County—now known throughout Georgia as Blue Springs Farms. And with the exception of flying trips to such meetings as the board of directors of U. S. Steel and Chemical National Bank & Trust Co., Callaway stayed at his farms working out the first part of his idea, i. e., that conservation farming can improve average worn-out land to the point where it will again make a profit.

By Bert D. Robinson and James A. Smith

Callaway was host to more than 600 stockholders and agricultural workers at Blue Springs Farms in June 1946.

Good fishing in 3-acre pond on Georgia Better Farms No. 1, stocked with fingerlings only 5 months and 21 days previously. Holding the catch is the corporation's president, John D. Thompson; his companion is a stockholder, Judge Joe Peavy.

HE proved his point. Last year, for example, the gross income from his Blue Springs Farms reached $325,000. This is income from 1,100 acres of kudzu, 500 acres of sericea lespedeza, 350 acres of alfalfa, several acres of muscadine grapes and blueberries, 6,000 turkeys, 14,000 mallard ducks, 250 head of beef cattle, and a few other items. The perennial crops are harvested, dehydrated, ground, and used as protein supplement in dairy and other harvested feeds.

So far, so good—but how about the second, and most important part of his idea? "We won't have achieved our objective until we have demonstrated these practices on farms and with the acreage and the kind of land available to the average farmer," Callaway repeatedly told friends.

By 1944 he had figured out what he hoped would be the answer. He christened it the "Georgia Better Farms plan," and set out on a personal sales tour up and down the State, backed by the Agriculture Panel of the Board of Regents, University System of Georgia. The response he got was phenomenal. Georgia people explain this in two ways. They point to the practical simplicity of the plan itself; and they point out that the man selling the plan was Callaway. Callaway in action, they say, is something to see. Stockily built, dynamic, friendly, Callaway gets action from business and professional leaders everywhere. His modesty is as genuine as his facts. These facts, and Callaway, so impressed Georgia's bankers, doctors, lawyers, farmers, merchants, and other business and industrial leaders, that more than 700 of them formed 100 farm corporations in 67 counties to carry out the Better Farms plan.

Here's how the plan works: The business and professional people form groups of seven, and each puts up $1,000. They purchase a farm, and hire an operator who wants to make a go of farming. They provide him with a few chickens, a pig or two, a cow, a garden spot, and as much machinery as can be obtained. They modernize the home and

Cason Callaway, pioneer and crusader for new ideas and new crops for the South, personally directs many of the activities on his Blue Springs Farms.

farm buildings, and follow a specific operating plan outlined by the local soil conservation district with the help of the Soil Conservation Service, the Georgia Extension Service, and the Georgia experiment stations for rebuilding worn-out land. In every case, the land was no better than the average land in the community, and often it was worse. It was important that this type of land be used if the demonstration was to be convincing. These farms average 140 acres in size. They consist of cultivated land, wooded land, eroded land, idle land—a wide assortment. They cost the corporations $3,100 each on the average, or about $22 an acre. All of them were in a run-down condition from neglect or from what many Georgians call "the South's curse:" Its one-crop system of farming, often followed for generations.

In the Piedmont the farms were badly eroded both by gullies and severe sheet erosion, with well over half the open land abandoned. In the Coastal Plain the land had been left idle to grow up in weed trees. Less than a half dozen dwellings on these farms were livable. The farm buildings were in poor condition too.

Two years ago a stockholder of one corporation described the farm his group purchased with these words: "Near the center of Georgia Better Farms No. 13 is a symbol of what brought ruin to the rural Southeast. It is an abandoned double-foot plow, its metal parts reddened with rust and its oak handles bleached and cracked by weather. It stands with blades still set in the ground, where a farm hand left it one evening maybe 5 years ago. * * * The Bermuda and Johnson grass, and scrub pine which followed the plow pushed into the fields. The open patches grew smaller and so did yields of cotton, corn and peanuts."

"But today," says this stockholder, "the old field lines have been straightened to round out an even hundred acres of cropland—put back where they were before tenant 'patch farming' did the things to this Dougherty County farm which are the inevitable results of methods which take no thought of the morrow."

This is one among the many corporations which have cleared and bulldozed rough land; removed stumps and rocks; constructed new fences and improved their pastures; added missing soil elements and planted cover crops; constructed new buildings and renovated old ones.

The stockholders have repeatedly shown how they feel about their investment. Practically all of them have invested additional money in amounts ranging from $3,000 to $5,000 to complete the demonstrations.

Which is exactly the attitude Callaway hoped they would take, and exactly the attitude he hopes to make general. It is this attitude, he feels, which will make available to good farmers the "long-term commercial credit they must have to lift Georgia agriculture out of its morass."

Callaway illustrates his point in this manner: "A doctor has $16,000 to invest. A neighborhood boy with $4,000 comes to the doctor and says he can buy a certain well-known worn-out farm in the community for this amount, and wants to borrow $16,000, a few hundred dollars each year, with

Many new homes and other farm buildings have been built on Georgia Better Farms. Here's the house on Farm No. 42 at Hawkinsville. Examining the farm plan are young Zane Goss, operator, and R. C. Massee, stockholder. To their right are Elma McEachern, stockholder, and Mrs. Goss.

NOTE.—Mr. Robinson is cooperative employee of the Soil Conservation Service and the Agricultural Panel of the Board of Regents, University System of Georgia, Atlanta. Mr. Smith is current information writer, Soil Conservation Service, Washington, D. C.

Little more than 2 years ago this was one of thousands of abandoned farms in Georgia. Faith in the Callaway program prompted Edward Bland, recent purchaser, to vow that he would "run rings around the two other Georgia Better Farms in Dougherty County." With a rotation of corn, peanuts, lupine, and grain, good dividends already are being realized.

which to improve it. Regardless of the young man's character," says Callaway, "I don't think the doctor would lend him the money, and neither would I. This is a normal reaction."

"But suppose several years from now the same type young man approaches the same type doctor and says, 'Doc I can buy this farm for $4,000. Georgia Better Farms No. — over in a neighboring county bought a $4,000 farm. They had a farm plan made and a budget worked out on reasonable expectancy as to how they would spend $16,000. Today they have a $20,000 farm and are making an acceptable return on the investment. I expect to have a land-use plan and a budget worked out similar to theirs. I believe I can do the same thing.' I don't say the doctor would automatically lend him the money; but he would certainly at least consider it; and there's a good chance he might do it."

There is nothing novel in the objectives of the Georgia Better Farms plan. Most of them are included in organized endeavors long under way, and during the past 10 years they have been vigorously advanced in Georgia. Most unique in this plan is the combined effort of seven men with identical interests in a common cause.

"Conservation farming is not new," Callaway concludes. "But when we get hundreds of farms demonstrating that it pays we are going to get Southern capital to back Southern farming in carrying out a specific agricultural plan."

In the spring of 1946 at a meeting of more than 600 stockholders and agriculture workers Cason Callaway announced an expanding program for the Georgia Better Farms. For the consideration of the stockholders the broader plan suggests several alternatives, any one of which should provide means for further demonstrating the soundness of the program. Ten prospective farm conservation plans were prepared to cover workable combinations of crops and livestock suitable for Georgia conditions, each an explicit outline of farm operations by years up to 5 years, indicating estimated permanent investment, operating investment, operating costs, and net farm income. A modification of these plans will provide suitable information for any farm operation that may be adopted.

Cason Callaway is so much convinced of the value of the Georgia Better Farms demonstrations that he is offering a 14-day trip through the North and Middle West to stockholders of the 25 top-ranking corporations in 1948. The Farm Panel will select the winning corporations for the trip, based on progress made through 1947.

Callaway says he anticipates at least 6 from each of the 25 lucky corporations will be able to make the trip. Other guests will include members of the board of regents, the chief executive of the State, heads of the State agricultural agencies, and the Farm Panel.

(Continued on page 164)

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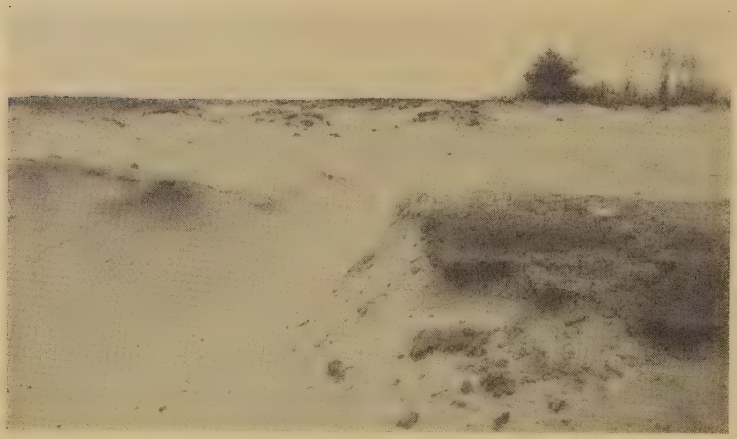
New England Dust Bowl Under Study

By Wellington Brink



Extreme example of devastation at Easthampton.

New England, too, has destructive winds and cantankerous soils. Dust storms rise with alarming frequency in the famed Connecticut River Valley, slash at onion and tobacco lands priced up to $1,000 per acre.

Until recently the patient people of Massachusetts did no fighting back. After each storm, they swept their homes, wielded their dustcloths, cleared their lungs and resumed their efforts to make quality crops in the face of ill-tempered Nature.

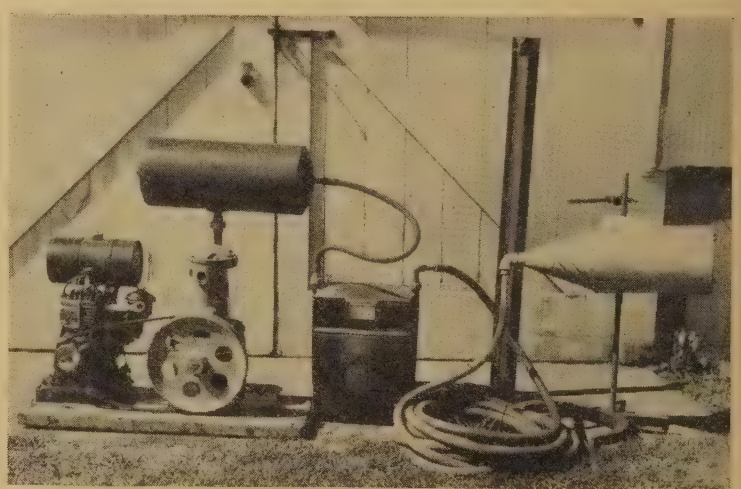
But patience and soils gradually grew thin. And science, quartered at the very scene of misbehavior, began to stir itself. As early as 1931 Amherst's noted Dr. W. S. Eisenmenger began to formulate the strategy of attack. And in 1937 he put his finger on the man best qualified to conduct this attack.

Karol Kucinski, research assistant at Massachusetts State College, grew up on a farm near Amherst. As a boy he saw the dervishes that swirled down the valley. Seldom did they reach the Kucinski farm in the rolling hills toward Pelham, but he knew the damage they were doing, the discomfort they were causing, and the fact that something must be done before it was too late. He watched carefully the fight waged by the Soil Conservation Service to nail down the blow areas of the west.

Kucinski's graduation in 1934 was followed by a fellowship for work toward a master's degree which was awarded in 1937. More recently Kucinski has continued his research in connection with a Ph. D. His thesis, "Some Properties of Wind-Blown Soils in Massachusetts," published last June, constitutes something of a milestone.

Kucinski began at the beginning, knowing full well that he had no western "bowl" on his hands. The soils were different, the crops were not the same. He was dealing with a contrasting climate and a different community of people and farming traditions.

Kucinski probed the valley's secrets indoors and out. He went to the fields with a portable dust-collector, to make an exact count of the airway's traffic. His gadget was complete with gasoline engine, air pump, tank, gas meter, suction hose and dust-filter unit, and it enabled him to find out exactly what particles were moving at varying heights from the ground. He could measure, then, their dimensions and their physical and chemical properties, and estimate the wind-wasting of fertility from the land.



Portable dust collector used to collect samples in field during storm.

Within his laboratory Kucinski constructed a 40-foot wind tunnel—a great neck 3 feet high by 5 feet wide, having at one end a 15-horsepower motor with airplane propeller. Large, flat pans, hung by wires from scales, were provided for soils under test. And across the surface of these soils, Kucinski, with the throwing of a switch, could send a wind of as high a velocity as 50 miles per hour at 1 foot above the "ground." The tunnel's function is to control and standardize comparisons.

Wind tunnel which measures losses of different types of soils under varied velocities.

Which soils blow most? Which least? Which conditions are most favorable to pushing the dust up into the air? Kucinski, over the months, has been gathering the needed data for reliable answers. He is still gathering the evidence, on which farmers of the Connecticut River Valley may base soil conservation practices in the future. He is working with the agronomy department, Massachusetts Agricultural Experiment Station, in cooperation with the Soil Conservation Service.

STRANGE behavior has been noted. These are Massachusetts soils, remember, not Texan—such soils as Windsor sand, Agawam fine sandy loam, Suffield silt loam, Merrimac fine sandy loam, Gloucester fine sandy loam, Cape Cod dune sand, and innumerable other groups unfamiliar to the western or southwestern farmer. They have their own peculiar flying habits. For one thing, those soils of finer material appear less likely to blow. Beach sand takes off more readily than silt loam. Ease of aggregation, of coagulation, has something to do with it. Chemical content is another factor. *Wet* soil "stays put" but *frozen* soils are nervous and flighty. Frost action lifts particles up where breezes can get at them, and sends them skittering. When there's no snow in the winter, dust whips up readily. Abetted by his tunnel, Kucinski has duplicated just about all the conditions imposed by Nature and has come upon many a surprising phenomenon hitherto unsuspected by the valley's producers of choice onions, potatoes, and tobacco.

What to do?

Karol Kucinski.

It is still too early to come out with anything like a complete program for the control of wind erosion in the area. As yet, the technicians will be well pleased if valley farmers will give adequate attention to windbreaks and winter cover.

Kucinski is suggesting employment under certain conditions of 4-foot fences of lath, braced by well-sunk posts, as barriers against prevailing winds, at the head of local "blow spots." Another idea he advances is the use of 4-foot-wide ribbons of grain as a similar temporary device.

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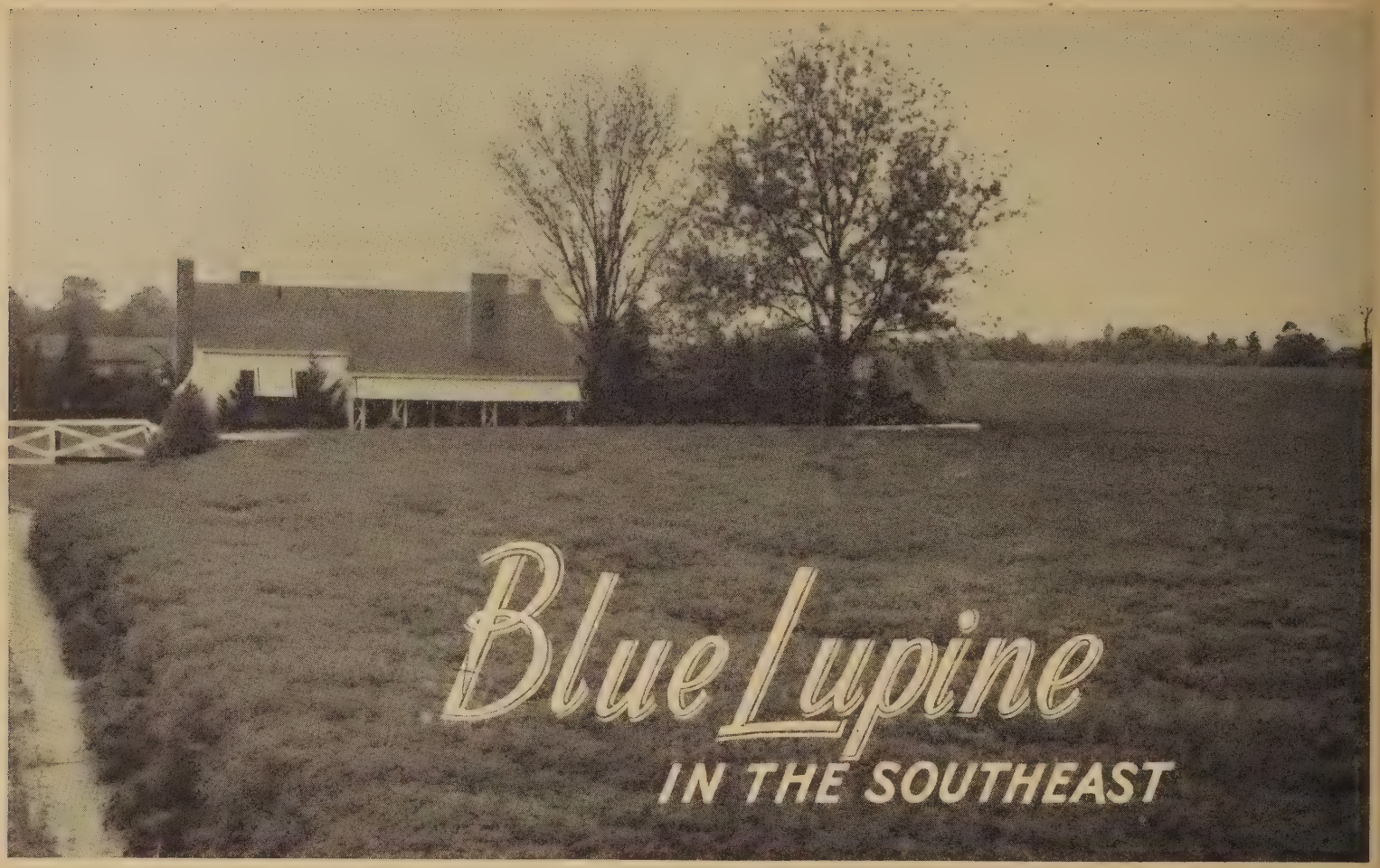

Blue Lupine IN THE SOUTHEAST

By R. Y. Bailey

A TOTAL of 37,300,000 pounds of blue lupine seed was harvested in Georgia, Alabama, and Florida in 1946, according to the Bureau of Agricultural Economics. Lupine took its place among the leading winter legume cover crops.

The Soil Conservation Service had an important part in achieving this remarkable record. Its interest is sharpened because blue lupine is filling such a vital place in soil and water conservation programs on the sandy soils of these three States, especially where peanuts are grown.

The luxuriant growth of lupine at the North Florida Experiment Station at Quincy, Fla., early in the spring of 1937 impressed Service representatives who visited the station. They thought that the plant might be the answer to a long-felt need in the deep South for a winter legume that would make early spring growth in time to be turned under for early planted crops, and that would produce seed.

The Service arranged with J. D. Warner, agronomist at the station, with W. E. Stokes, agronomist at the Florida Agricultural Experiment Station, Gainesville, Fla., to get a few hundred pounds of seed in the fall of 1938. This seed was planted in the demonstration project at Greenville, Ala. Results were sufficiently promising to warrant further plantings elsewhere.

A farm home, that of T. H. Bass, in a blue-green sea of blue lupine. This is in the Lower Chattahoochee River Soil Conservation District of Georgia.

In the fall of 1939, we purchased 1,500 pounds of seed with CCC funds and distributed 500 pounds to each of three CCC camps assigned to the Soil Conservation Service and working in the Coastal Plain of Georgia, Alabama, and Mississippi. In spite of the severe winter of 1939–40, the lupine made fair growth at Perry, Ga., and Dothan, Ala. Severe freezes damaged the plants at the Collins, Miss., camp to such an extent that local personnel decided lupine was out of its range over there.

Additional plantings were made in Georgia and Alabama in the fall of 1940 with seed harvested the previous spring. Several farmers had become sufficiently interested in lupine from observations they had made of the plantings that survived the severe freezes of January 1940, to purchase additional seed from Florida that fall and again in the fall of 1941.

NOTE.—The author is Chief, Regional Agronomy Division, Southeastern Region, Soil Conservation Service, Spartanburg, S. C.

After this country entered the war, there was an immediate demand for greatly increased production of peanuts for food and other purposes, and a heavy burden was placed on the erodible sandy soils of the peanut belt. Soils left bare by the harvesting of peanuts proved highly susceptible to erosion, particularly sloping land.

Farmers and others in some of the principal areas of peanut production became alarmed over the severe land damage that might result from several years of intensive cropping of large acreages. They had grown peanuts in the past, but the acreage had been hogged off so that the vines were left as a protective cover on the land. The largely increased need for peanuts would likely expose too large a proportion of the land to both erosion and depletion of organic matter.

Thus it came about that Soil Conservation Service was called on to take immediate steps to get some kind of cover on the land after the harvesting of peanuts. A committee of interested people went to Washington and talked with the Chief of the Service. They had a serious problem on their hands and they required help immediately.

In the spring of 1942, a conference was called at Spartanburg, S. C., to find ways for meeting this need. Representatives of the Washington, regional, and area offices spent 2 days in formulating a plan of action.

Following this meeting in the regional office, tentative outlines were developed for several kinds of field plantings of different winter crops that might provide ground cover following harvesting. Agronomists from Georgia, South Carolina, and Alabama met with representatives of the Washington, regional, and area offices in June 1942 to lay out a program.

In the fall of 1942 the Soil Conservation Service purchased sufficient blue lupine seed, Austrian Winter peas, and oats for observational plantings in the principal peanut-producing areas of Georgia, Florida, and Alabama. Several different seeding methods were tried. These included seeding ahead of harvesting peanuts so as to allow cover-crop seed to be covered by the digging operations. Different methods of seeding immediately following the harvesting of peanuts were also used. And various dates of seeding were tested.

J. D. Warner, agronomist at North Florida Experiment Station, in field of blue lupine.

As has been pointed out, it is common practice in the runner-peanut areas to glean peanut fields with hogs after peanuts are picked from the stacks in the fall. We could not ask farmers to keep hogs out of the fields, because they depended on the gleanings for a considerable part of their hog feed. Also, the pork that could be made in this way was as necessary in carrying on the war as were the peanuts.

We decided that unless sufficient roots could be developed while peanuts were in the stacks, to survive the gleaning by the hogs, we could not hope to succeed with cover crops. Consequently, we asked farmers to subject fields where cover crops were seeded to normal gleaning by hogs, so that we could see whether any cover crops would survive.

Blue lupine came through the gleaning period surprisingly well. Although many of the plants were destroyed, a great many others survived and provided considerable protection during the winter and either a seed crop or a green manure crop in the spring. Early plantings survived much better than late plantings. Lupine usually made the best showing among cover crops.

Farmers in the Wiregrass Soil Conservation District of Alabama were more successful with their cover crop plantings in 1942–43 than those in the Georgia and Florida districts. We studied field results in all three States and tried to learn why certain plantings had failed and others had succeeded. Numerous photographs and notes helped to explain the reasons for success or failure.

Lantern slides made in Alabama where plantings were successful whetted the determination of farmers in Georgia to try again in the fall of 1943. Additional seed was purchased by the Service for use in Georgia, Alabama, and Florida in the fall of 1943. Cooperative field trials were planned with State experiment stations and extension services in 1943. It was interesting that farmers in those communities in Alabama where the 1942 plantings were successful were not interested in seeing trial plantings made in their communities in the fall of 1943. They were convinced and fully ready to go ahead with planting their entire acreage of land from which they were harvesting peanuts that fall. Several farmers who began with small patches in the fall of 1942 planted all of their 100 to 200 acres of peanut land to blue lupine in the fall of 1943.

More than 23 tons of green vegetation per acre. James K. Alvis and D. C. Morris, Soil Conservation Service technicians, weigh blue lupine cut from small plot on Haley Farms. The Haley brothers planted more than 1,800 acres of blue lupine in 1944.

Supervisors of soil conservation districts in southern Georgia met at Tifton in the spring of 1943 to discuss cover crop problems on their peanut lands. They were shown lantern slides that were made in the three principal peanut-growing States in the spring of 1943. Reason for success and failure of the different plantings were discussed. These supervisors conducted a campaign during the summer of 1943 to get cover on peanut land that fall. They enlisted the assistance of all agricultural agencies, bankers, merchants, and others in getting farmers interested in planting lupine.

Supervisors in southern Georgia, as well as those in the other States, have continued to promote the idea of getting cover on peanut land. Largely as a result of the foregoing activities of the districts and the different agricultural agencies, blue lupine has come along very rapidly during the past 5 years. It is of interest that Georgia was the leading seed-producing State in 1946 with approximately 27,000,000 pounds.

As a result of the unfavorable start with lupine in Mississippi, there was a lag in interest in the

crop there. The relatively small acreage of peanuts grown in Mississippi probably was one reason why lupine was slow to get started. This is mentioned to show something of the relationship between peanuts and lupine. The heavy demand for harvested peanuts in the other States created such a serious problem that we had to do something about it. A few failures with lupine did not discourage farmers and field personnel in these areas of heavy peanut production to the same extent as in Mississippi where they had a less extensive peanut acreage.

Largely as a result of the influence of regional technicians of the Service, and the harvesting of lupine seed at one of our regional nurseries, additional plantings were made in southern Mississippi in the fall of 1945. These plantings were successful, and, as a result, we have received a report that the work group of Lucedale planted 235,000 pounds of lupine seed in the fall of 1946.

We have shipped lupine seed from the Southeast to interested farmers across the river. In the spring of 1944, Grover Brown spent 10 days in the peanut belt of Georgia, Alabama, and Florida. As a result of what he observed in these States, he discussed blue lupine in portions of Texas where he thought it might grow. About that time, too, an article appeared in Country Gentleman which described the work being done with lupine in the Southeast. As a result of the two events, farmers in Texas ordered seed from an Alabama farmer. Press releases indicate that farmers, county agents, and others are waxing enthusiastic about lupine's future out there.

One of the problems that we face now is to get lupine fitted into a soil and water conservation program. We must guard against allowing it to become the entire vegetative program in areas where it is important. The crop grows so well and stirs so much local interest that it may be allowed to overshadow other necessary phases of a vegetative program. It fits almost perfectly as a cover, following harvested peanuts, and should have a place in areas where it is adapted, wherever annual winter legumes are planted in the fall and turned under in the spring. Its ability to make seed that can be harvested each spring is particularly important in areas where farmers spend money each fall for cover crop seed.

The rapid increase in seed production indicates that blue lupine may reach the hundred million mark within the next 5 years. The sandy lands of the Coastal Plains need several hundred million pounds of lupine seed annually. We don't know how much seed finally will be harvested and planted in the Southeast, but a fair start toward the goal has been made.

The Soil Conservation Service derives considerable satisfaction from having pioneered the introduction of this valuable legume, following the work of the Florida Agricultural Experiment Station in making seed available and in showing us the possibilities of the crop. Our regional type of organization was a distinct help in blue lupine's wide distribution, for when the legume failed in one State we used the results in another State to encourage further trials.

Press Supports Districts

At the recent annual meeting of the Southern Newspaper Publishers Association, the following resolution was adopted:

Resolved, by the Southern Newspaper Publishers Association at this annual meeting, that we wholeheartedly endorse the soil conservation district movement, and urge members to (1) encourage farmers to form districts where districts have not been created, (2) include soil conservation, as now carried on by these districts, in their community betterment programs, (3) give full support to the work of soil conservation district, (4) encourage business, industry and other urban groups to give even greater assistance to the conservation of our land resources, and (5) advocate the teaching of soil conservation in public schools.

Classrooms Expand in Alabama

By James W. Burdette

ON THE rolling red hills of Clay County 40 Alabama teachers and school officials last summer found a new textbook—the land itself. By now the group of 40 has grown to 820, all of them teaching right out on the land the way to a better living through the wiser use of soil and water.

It now looks as if every Alabama school one day will be carrying soil conservation to its students

NOTE.—The author is head, section of education, Soil Conservation Service, Spartanburg, S. C.

C. L. Turnipseed explains wildlife border planted to bicolor, sericea, and partridge pease. The teachers, attending the Lamar County Farm Resources Workshop, are Mrs. D. Z. Vick, Fayette, Ala.; Evelyn Davis, Kennedy, Ala.; Helen DuBose, Crossville, Ala.; Mrs. Marion Turner, Sulligent, Ala.; and Sarah Waldrop, Millport, Ala.

Thirty-five Alabama teachers hear Bob Hoit, district conservationist, explain a farm plan.

without adding a single new course to the already crowded curriculum. Instead better land use and soil conservation methods will be established as an integral part of the other courses.

The transformation began with resource-use workshops for teachers at the University of Alabama, Alabama College, Alabama Polytechnic Institute, Florence State Teachers College, and Jacksonville State Teachers College. It gained momentum when 40 educators chosen from the workshops, and meeting at Clairmont Springs for a week's study of soil and water conservation, were taken to see first hand the conservation practices used in the Piedmont Soil Conservation District.

The Clairmont Springs meeting represented weeks of careful planning by O. C. Medlock, State conservationist of the Soil Conservation Service, and Dr. Ed. J. Carter, formerly of the Alabama State Department of Education.

It was a new idea in the training program for Alabama teachers.

How would the teachers react to strenuous trips through the fields, pastures, and woodland? Could they see anything that would be useful in the school next year? Could the technicians develop in simple terms the workshop theme, "Better Living Through the Wise Use of Land"?

Field trips were made each morning. Travel was held to a minimum, no more than two farms being visited on any one trip. Soil Conservation Service technicians carefully explained one phase of land use and then conducted the group over the farm, pointing out how it could be applied to this particular farm, field by field. Often the farmer himself accompanied the teachers and assisted in answering questions.

On Monday there was an inventory of soil resources, conservation survey, and land-use capabilities. The group studied farm planning on Tuesday. Then followed, day by day, engineering, agronomy, woodland and wildlife practices. Each afternoon the teachers discussed what they had observed during the morning study trip, and how the information could be used in the schoolroom. Motion pictures, talks by leaders in agriculture and industry, singing, and group sports each evening rounded out the day's program.

Indications that the workshop was a success were evident before the end of the week. Teachers and school officials were asking for a bigger workshop next year.

Several months have passed since the Clairmont Springs venture. But the experience and knowledge gained at that time are being used as the nucleus for an ever growing program.

Let's take a look at what's been going on in the

Tombigbee-Warrior Soil Conservation District. K. N. Tucker, district conservationist, and four teachers who had attended the Clairmont Springs workshop, recommended to County Superintendent G. S. Smith a county-wide workshop for Lamar County teachers. This brought together 120 Lamar County teachers, late in August, for a 3-day outdoor study course. Field trips, motion pictures, and discussions by leading educators were its high lights. Not to be outdone by Lamar County, Fayette County arranged for a 5-day workshop for more than 100 teachers the following month.

With more than 250 teachers in Tuscaloosa County, District Conservationist Tucker and school officials developed a slightly different approach. They called the 35 school principals together for a half-day discussion. The film "This Is Our Land" was shown, and there were talks by representatives of the university. Next day C. L. Turnipseed, Jr., work unit conservationist, led a conservation field study trip—a trip which included a study of soils and land capabilities and the needed practices on an unplanned farm and the established practices on a farm with a complete conservation plan.

On the following 2½ days all teachers in Tuscaloosa County heard from the principals what they had seen, through panel discussions, motion pictures, and group meetings. Now, all 241 teachers are interested and all are planning to make field-study trips soon. Their theme is "The Place of Schools in Building a Healthy and Prosperous People in Tuscaloosa County."

In an adjoining district, Conservationist A. L. Harrell and Cullman County school officials participated in a 5-day workshop for 310 teachers. These teachers represented 43 schools. Tom O. Watson, district supervisor, attended the workshop for 2 days and took an active part as a consultant in group discussions. State Conservationist Medlock spent 2½ days with the group and gave an illustrated talk before the teachers went to the field.

Standard conservation practices were scrutinized on the W. J. Daniel farm. Pasture development, crop rotation, meadow outlets, wildlife border strips, and other measures, were explained by technicians. For comparison, the teachers visited an adjoining farm not under district agreement. The contrast between the farms was most striking.

Several teachers who own farms have already made application to the district supervisors for farm plans. Superintendent R. E. Moore of Cullman County reported to Harrell that "in the opinion of the teachers, as well as the Board of Education, the workshop was among the best ever held in Cullman County."

It can be said accurately that these soil conservation districts, which welcome help in conservation from every agency and individual, now have more than 820 new conservationists. And as these 820 teachers unloose in their classrooms their new understanding of the soil and its needs they will be making converts of their pupils—8,000 or more potential soil conservationists, the new generation on which the future of the local agriculture so largely depends.

LAND VALUES

(*Continued from page 149*)

paid are reduced to a very low state of productivity. The remedy is to guard against contracting long-term investments on the basis of temporary high incomes.

Conservation farm planners, district conservationists, and district supervisors can do much to prevent the disasters which are sure to follow excessive farm debt. They can teach farmers and other farm-land investors the fundamental facts concerning land values. Warnings against capitalizing current high incomes into long-term contractual debt may produce more soil conservation than some of the more direct measures commonly followed.

NEW ENGLAND DUST BOWL

(*Continued from page 155*)

"It may be said without reservation that there are no cultivated fields that cannot derive some benefit from plowing under of a cover crop," Kucinski holds.

He favors rye on tobacco and early potato fields, which are usually harvested before Labor Day. But, on the other hand, "barley or oats, which will winter-kill, yet produce a desirable protective mat cover, may be used in tobacco fields which are not expected to be plowed in the early spring." He has much more to comment on the usefulness of various cover plants but it all adds up to an urgency to get masses of roots and leaves and stalks out there on, and in, the surface inches to keep the soil quiet while the wind whistles overhead.

Farming in the Land of Cecil Rhodes

BY CHARLES R. ENLOW

Final stage of building ridge terrace with ditcher and disc plow.

Broad-base terrace after remaking with disc plow.

SOUTHERN RHODESIA has many modern farms. Some of them electrified, and many having milk separators, feed grinders, corn shellers, refrigerators, and radios. Pure bred horses, cattle, and sheep seem to be more common than in the United States. Farm homes generally are delightful. It's a long way between them, but what a pleasant surprise when one arrives!

The author recently spent 3 weeks visiting farms, ranches, and agricultural experiment stations in Southern Rhodesia, traveling 1,500 miles in Government-owned, American-made cars on very good roads. Visits were made also to tobacco warehouses, factories, and auction sales to dehydrating plants and cold storage plants; and to ruins so old that all records are gone. And gold mines, run by farmers! A good many farmers raise corn, tobacco, potatoes, wheat, peanuts, hay crops, and livestock, and operate gold mines on the side.

There are only 70,000 whites ("Europeans"). Less than 4,000 are farmers. The farms average 3,000 acres in size, not counting a few large ranches that run from ¼ to 2½ million acres. The natives outnumber the whites 20 to 1.

NOTE.—The author is agricultural attaché, U. S. Embassy, Union of South Africa.

Native cattle grazing on sweet veld in granitic soil area.

Gully control structures on E. S. White farm near Concession.

Southern Rhodesia is mostly classed as "forest." Actually because of repeated burning, much of this is of scrubby growth. In general, the country is a plateau, sloping to low altitudes on the Zambezi river, along the northern boundary, and the Limpopo river, along the southern boundary. The two principal centers of population, Bulawayo in the west and Salisbury in the northeast, are nearly 5,000 feet above the sea. They are clean and attractive cities.

The Newmarch and McClean farm, near Salisbury, contains 5,000 acres, 2,500 of which are under cultivation. About half of the cultivated land is in corn, a white eight-row dent of a flinty appearance. Two hundred fifty acres are planted to potatoes (Scottish seed) and considerable acreages are used for sunn hemp (*Crotalaris juncea*), cowpeas and sunflowers. Practically all fields are broad-base terraced. Cultivation generally is across the terraces. Approximately 60 percent of

the cultivated land is terraced, as this is one of the practices required to get the conservation bonus payment of 2 shillings (40 cents) per 200-pound bag of corn produced. Four hundred head of cattle, mostly of the Sussex breed, are fed on veld hay, sunn hemp hay, cowpea hay, and sunflower heads, mixed and ground. Veld hay is also cut in quantity for bedding, and enormous quantities of compost manure are used, principally on potatoes. Three hundred bacon-type hogs are raised on carefully balanced corn, potatoes, meat, blood, and bonemeal.

Newmarch andMcClean also operate a gold mine on ancient diggings. It is about 500 feet deep. The gold is extracted by the cyanide process. Shafts used by the ancients have been uncovered. They are only 2½ feet in diameter.

The farm is equipped with machine shops, electrically operated feed grinders and hammer mills. Repair work can be done right at home. Flour and "mealie" meal (corn meal)—one of the principal foods of the natives, are made on the farms.

W. Adams, a dairy farmer near Salisbury, operating a farm of 1,500 acres, carries 400 head of Holstein cows and young stock. His farm buildings are good, and the residence is most attractive. Here again everything is operated by electricity, except that natives do the milking. The pastures have all been grubbed, and are mowed to control brush and weeds. Corn is grown both for silage and grain.

W. Sole, at Glendale, is one of the leading farmers in Southern Rhodesia. His 440-acre corn crop (not hybrid) this year will average 20 bags (71.4 bushels) per acre. He had produced 56 bushels per acre over a 17-year period. These are dairy cattle, hogs, horses, and poultry. Alfalfa, sunn hemp, velvet beans, perennial sudan grass are among other crops grown. This farm also is electrified.

Southern Rhodesia is primarily a livestock country. Europeans own approximately a million head of cattle, and the natives about two million. The native cattle are of mixed breed, well adapted to the climate. Africander cattle, an excellent breed, seem to predominate in the herds of European farmers. Mostly work oxen are of this breed also. There are some very fine Black Angus, Shorthorn, Sussex, and Hereford cattle. Many of the farmers and ranchers are following well planned cross-breeding programs in order to combine the best qualities of foreign breeds with the heat resistance and other good qualities of the Africander and other native cattle.

There are 300,000 sheep in Southern Rhodesia, three quarters of a million goats, 150,000 hogs, and a few thousand horses and mules. There are many kinds of wild antelope, which furnish much food and good hunting.

The Agriculture Experiment Station at Salisbury has developed some corn hybrids that are said to be yielding a hundred bushels per acre. The livestock breeding work centered at Matapos is extensive. The program is very practical, most suited to Rhodesian conditions. A comprehensive pasture program, carefully planned to answer the problems of the country, is getting well under way. Other research has to do with fruit, tobacco, green manure crops, seed production, etc.

Definite areas, "native reserves," are set aside all over the country for the natives, who generally are not the best of farmers. The Department of Native Affairs has carried on some soil conservation work in these areas, and yields in some instances have been increased fourfold.

Everyone who goes to Rhodesia should see Zimbabwe Ruins, near Fort Victoria. They seem to fit in with a series of other ruins leading to the coast, with gold mining—apparently their objective. What is more interesting to agriculturists are the ancient terraces. Along the mountain slopes from Nyanga to Umtali, there are hundreds of square miles with bench terraces and old irrigation ditches, many preserved by a heavy growth of grass. Some of the structures have stone retaining walls, others are of earth construction. The engineering is of high order, with gradients similar to those used today.

GEORGIA BETTER FARMS

(*Continued from page 153*)

The trip will include one day on the United States Department of Agriculture experiment station, Beltsville, Md., the Hershey farms in Pennsylvania, Seabrook farms in New Jersey, the experiment station at the University of Wisconsin, a day in Chicago at the Gary steel works, and at least 1 day in the corn and hog section of Iowa.

The attention of a great many people in Georgia and other States in the Southeast are focused on the 100 demonstration farms. Practical farmers who know about the Georgia Better Farms set-up say the program already has brought about a closer relationship between business and agriculture.

Card of Appreciation

The Rev. S. Norman McCain, Jr., of Copenhagen, N. Y., has a new way to herald soil conservation. He writes postcards to conservation farms he sees on his trips through New York State and New England. His postcards are different. He addresses them like the one he sent to W. I. Goodrich, of West Danville, Vt., a cooperator of the Winooski Soil Conservation District. Mr. Goodrich received a card addressed to "The Man of Cabot on Route 2 Who Contours His Crops, Cabot, Vt."

Mr. McCain, an ardent conservationist and graduate forester, feels that his novel addressing of cards will attract attention at the post offices which handle them. His card to Mr. Goodrich reads:

"DEAR SIR: Of course it is a pleasure to drive through as beautiful a State as Vermont, but it was a special pleasure to me when I saw your crops on countour. The beauty of Vermont comes from its hills and mountains, and because of this it is essential that the land be farmed properly. It is a sad sight indeed to see topsoil being washed away. It makes for a poor country. I hope ever so much that your neighbors will see the wisdom of your actions and follow your leadership. May your harvest be plentiful."

The forestry-trained minister says that he can't hope to tell farmers in his congregation how they should farm, but he can tell them that "the land is a heritage for them to use as God would have them use it." He maintains that when a farmer allows his fields to wash down into the road, he is wasting something that is not his to waste.

Mr. McCain practices his lessons on his contoured garden plot—50 by 100 feet.

"The Land Has Been Kind"

BISHOPVILLE, S. C.

SUPERVISORS LYNCHES RIVER SOIL CONSERVATION DISTRICT,
Bishopville, S. C.

DEAR SIRS: Back in 1938 I came back to my old farm of 95 acres that I had bought in 1909. From 1938 to 1943 I tried to make a living for my family of five on this badly eroded and depleted land that had been mistreated during my absence.

For a colored family with little income, we started out with a mortgage, 2 mules, 1 milk cow, 25–50 chickens and enough hogs for home use, and then some years we had no meat. Each year I had to buy corn, as my yield averaged only about 15 bushels and also had to buy 3 to 4 tons of hay each year. My oat yield was low—about 15 bushels—and averaged 7 bales of cotton on 16 acres. This was the picture in July 1943 when I requested the services of the Lynches River Soil Conservation District mainly to help me in a terracing program.

The man from the Bishopville office advised me of a program for the whole farm, as he said, "to make it self-supporting." He also maintained that the soil was low in fertility, rolling and badly washing, which as he said put it in classes IV and V. Of course, this was all Greek to me, but from what he described as to the meaning of this, I knew he was pretty near right from the first 15 years' experience of farming this land.

If I do say so myself, I have followed the plan as closely as I could in the past 2 years. Early in 1944 I got all of my land terraced—about 30 acres—and seeded two 1-acre sericea meadow strips and one permanent strip and set up strip cropping on about half the land.

Then again in 1945 I seeded 3 more acres of sericea; also, I set out an acre and a half to pine trees in thin woods and part of a field that was light. Further, I have cultivated these trees by planting a row of cotton between each row and also added stable manure.

While my yields last year were a little above the average of the last 15 years, they have increased this year beyond my expectations. I have been told that my oat crop was the best in Lee County. Thirty-four bushels and 1 peck was saved for seed from a half acre. My sericea has been cut twice this year for hay and I wouldn't be without it for a crop. My corn crop will average, I believe, 30 bushels to the acre and it looks as if I will get 15 bales of cotton from 19 acres.

With the increased crop yields, I have also increased my livestock to 4 mules, 3 cows, 8 head of hogs, 8 pigs, several hundred head of chickens, and 14 head of turkeys.

The Lord has been kind to me, for I am in better shape of living now than ever in my life for with this year's crops the mortgage will be paid off.

Yours truly,

(Signed) EVA CORBETT.

A NOTE IN PASSING

The airplane is here to stay. The matter-of-fact tone of the September report which Soil Conservation Service Technician Larry Short of Canadian, Tex., turns in to his headquarters leaves no doubt of that.

Short reported: "The regular meeting of the Hemphill County Soil Conservation District was postponed a day and Supervisor John A. Neece of Mobettie, who is without a telephone, was notified of the change by our flying supervisor, Ed. P. Little of Canadian, who dropped a note from his plane."

DISTRICT PROFILE

F. J. SIEVERS

LAST of the 48 States to enact a standard districts law, Massachusetts is rapidly getting soil conservation on the land. As a traditional citadel of democracy, the Bay State is patient and painstaking in her weighing of great issues. Her people have grown up liking the town hall style of doing public business, the free-for-all forum which invites both pros and cons and makes room for every shade of opinion. After watching soil conservation districts at work in 47 other States, Massachusetts grew to like them: here, too, was home rule; here, too, was freedom of speech; here, in the provisions for petition and referendum and control by farmers themselves, was the old familiar town hall idea. Massachusetts, therefore, took joyously to herself the machinery and opportunities of soil conservation districts and cast the vote that made the program 100 percent and Nationwide.

In forefront of the State's agricultural leadership—a man who labored fruitfully for the enactment of the soil conservation districts law and ever since has consistently thrown his great force into the development of the district's program—is Amherst's distinguished F. J. Sievers. He is a man of multiple responsibilities. Sievers not only is active as a member of the State Soil Conservation Committee but is also director of the agricultural experiment station and director of the graduate school of Massachusetts State College. Incidentally, his was the first of the State experiment stations to adopt soil conservation for its own farm acres.

Physically, Sievers looks as if he might have been a varsity tackle in student days. His frame is straight and rugged, his lean weight convincing. His gray-haired dignity is tempered by quietly simmering humor. He has a story-telling flair. And it is said that one reason why he is a convincing speaker is that he can argue without becoming angry. He enjoys both bridge and golf, and one of his cronies admiringly states, "Sievers has a peculiar delivery on the golf course; he winds up, then bang!"—inferring that he can hit the ball a long way.

Director Sievers.

That evidently is characteristic. He wound up deliberately, then—bang!—the soil conservation districts took off in the grand manner.

Sievers is a son of Wisconsin—took his bachelor's and master's degrees at the university there. Eventually, he became professor of soils in the State College of Washington, where he became acquainted with the Pacific Northwest branch of the dust-bowl clan. When he came to Massachusetts State College in 1928, he noted at once the kinship of the storms of the Palouse country with those which rage periodically in the Connecticut River Valley at Amherst's door.

Sievers discounts his own contribution to the enactment of Massachusetts' district law, giving credit to farmers and to others on the college staff. "We served entirely in an advisory capacity," he says. "We didn't appear as promoters or agitators—the legislature came to us, not so much to be convinced as to be intelligently counseled."

Sievers is pleased that soil conservation work in his State "has taken a direction that I like to think is consistent with correct educational procedure. No move has come but from those who were to participate and be served.

"We have appealed to the pride of our Massachusetts farmer, have made him conscious of the fact that if he has a gully on his farm it is a reflection on him. Once he feels that way, the rest is easy—he accepts soil conservation as a matter of course."—*W. B.*

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Soil conservation works for the farmer in winter, too. Furrows plowed on the contour catch snow, retain moisture, allow the water to seep into the ground slowly. This is one effective way to help prevent floods and at the same time assist vigorous plant growth.

U. S. GOVERNMENT PRINTING OFFICE: 1947

March
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SOIL CONSERVATION

OFFICIAL ORGAN OF THE SOIL CONSERVATION SERVICE

NITED STATES DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

SOIL CONSERVATION

CLINTON P. ANDERSON
SECRETARY OF AGRICULTURE

HUGH H. BENNETT
CHIEF, SOIL CONSERVATION SERVICE

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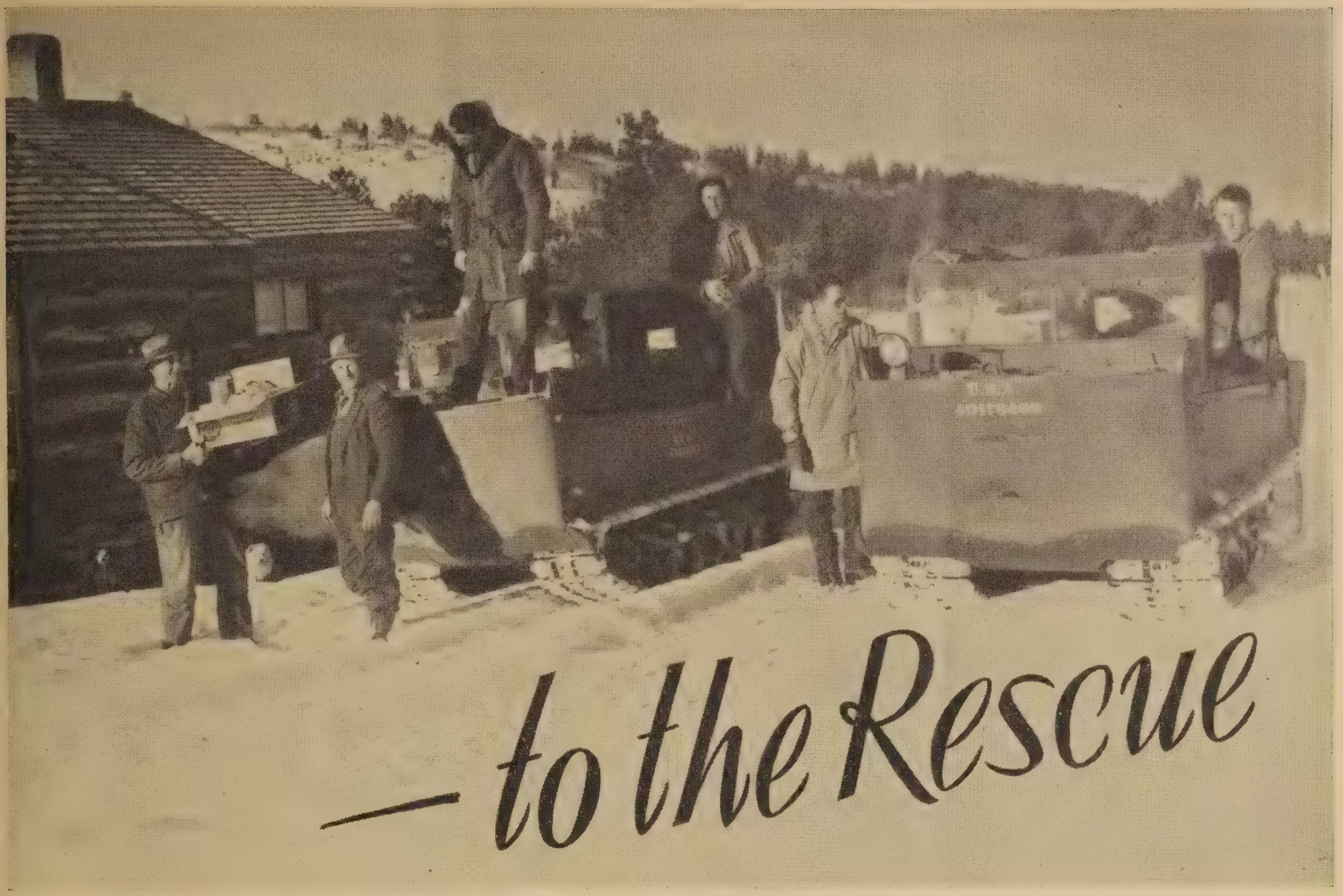
MARCH • 1947

WELLINGTON BRINK, EDITOR

CONTENTS

Front Cover: This Hereford bull, strong, healthy and well-conditioned, is the beneficiary of the nutritious, plentiful range which results from careful conservation management.

SOIL CONSERVATION is issued monthly by Soil Conservation Service of the United States Department of Agriculture, Washington, D. C. The matter contained herein is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business, with the approval of the Director of the Budget. SOIL CONSERVATION seeks to supply to workers of the Department of Agriculture engaged in soil conservation activities, information of special help to them in the performance of their duties. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., 10 cents a copy, or by subscription at the rate of $1.00 per year, domestic, $1.50 per year foreign. Postage stamps will not be accepted in payment.



—to the Rescue

Snow weasels, loaned by the Pueblo Ordnance Depot to the Soil Conservation Service, carried food and medical supplies to marooned families and took the sick to town for treatment. (Photo by Morris-Walsenburg.)

BY VIRGIL S. BECK

SNOW started falling over eastern Colorado early on November 2, 1946. By midafternoon a full-fledged blizzard had developed, which continued unabated for 40 hours. With brief lulls, the snowstorm raged more than a week over the area from Denver south to Trinidad and east to the Kansas line.

It was the worst snowstorm since December 1913, when scores of lives were lost and many thousands of cattle and sheep perished. All roads were blocked. Farmers and ranchers who normally figured on getting into towns for food and supplies at frequent intervals were isolated.

Ranchers in this area depend on year-around grazing, with a small amount of feeding during stormy periods. The heavy snow prevented livestock from grazing. High winds drifted arroyos full of snow, and thousands of livestock were trapped and cut off from feed.

Urgent pleas for food, medical supplies, and feed for livestock poured into almost every city and town in the snowbound area. County equipment was pushed to the limit trying to keep the main road open.

Work in soil conservation districts throughout the area had acquainted ranchers and farmers with the fact that most of these organizations owned tractors and other equipment that could be helpful in rescue work. District officials and Soil Conservation Service technicians, therefore, in many instances, took the lead in planning rescue work.

At a meeting of farmers and townspeople in the district work unit office at Fowler November 5, 1946, it was agreed that there was not enough district equipment in the storm-stricken area to provide relief in time, so the group decided to ask the Pueblo Ordnance Depot for more equipment.

D. C. Bascom, work unit conservationist at Fowler, called Col. Joseph Horridge, commanding

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NOTE.—The author is head of the current information section, Soil Conservation Service, Albuquerque, N. Mex.

Ordinary trucks couldn't make it through the pile-up of snow. These three stranded vehicles are being towed by a district tractor.

officer of the depot, and explained the critical need for equipment. The colonel cited regulations prohibiting the lending of Army equipment to any other than a Federal agency, so Soil Conservation Service representatives readily agreed to accept full responsibility. Soil conservation district officials guaranteed the expenses for operations. Colonel Horridge immediately obtained clearance from Washington.

Within a few hours 70 pieces of ordnance equipment were dispatched on rescue missions which were to save scores of human lives and many thousand head of livestock during the next 3 weeks. Giant six-by-six trucks, proved effective in going through 5-foot snowdrifts and often were operated in pairs, with one pulling and the other pushing. They were driven by civilian volunteers and used mainly for getting feed to livestock. Snow weasels, handled by Army personnel, carried food, fuel, and medical supplies to isolated families, and took sick persons to hospitals.

A few days later Field Bohart, president of the Central Colorado Soil Conservation District, conferred with J. S. Young, district conservationist, and it was decided to make an aerial survey of about 2,600 square miles of the snowbound area east of Colorado Springs. Bohart, an experienced flier and a member of the Sky Ranchers Flying Club, contacted this organization and others, and formulated plans for the reconnaissance flights.

Young got in touch with all radio stations and arranged for the broadcasting of instructions to snowbound families. By making crosses on the snow with soot, boards or fertilizer, they could indicate their need for help—one cross for food, and two for medical attention.

Thus, probably the greatest cooperative rescue mission in the history of Colorado got under way.

The worst blizzard since 1913 walled in farmers and ranchers of eastern Colorado, made it necessary for them to dig out from under 3 to 5 feet of snow.

Many district offices became rescue headquarters and were kept open day and night to receive calls for aid and to direct the rescue work. While district and Service people took the lead, the success of the mission resulted from the unified efforts of numerous groups. Personnel of the

This is one of the many flocks of sheep saved from starvation by rescue workers. These 1,500 animals were driven to feed over the trail opened by the machine in the foreground.

Pueblo Ordnance Depot, in addition to providing vehicles, worked untiringly throughout the crisis, as did personnel of Peterson Air Field at Colorado Springs. The Red Cross, county commissioners, county agents, individual farmers, ranchers, and townspeople contributed their full share. Radio stations broadcast messages to the marooned.

In addition to planning reconnaissance flights, Young maintained emergency relief headquarters in his Colorado Springs offices for all of eastern Colorado for 5 days before the Red Cross began functioning. Service employees Leland C. Higginson, M. R. Murphy, W. S. Caton and others made numerous flights with Fifteenth Air Force crews, dropping foodstuffs to snowbound families. James Dewey and Ed Bryant traveled more than 500 miles in weasels, distributing food to scores of families. Young accords much credit for the success of rescue work to Field Bohart, who had the foresight to purchase a weasel more than a year previously for use in just such emergencies, and who planned the relief work so efficiently.

In addition to arranging for the use of Army equipment in the rescue work, D. C. Bascom, work

Two weeks without feed was too much for this bull. He became too weak to walk and had to be shot.

All roads were impassable; many had drifts worse than this.

unit conservationist at Fowler, kept his office open continuously for 14 days. There was an average of 16 calls per night for aid, in addition to a heavy daytime load. The office was used as a clearing point for routing vehicles and assigning volunteer drivers and guides, many of whom worked as long as 48 hours without sleep. Bascom reports that 43 trucks and weapons-carriers were used in assisting 112 ranchers in the area. No record was kept as to how many people received food and fuel transported by weasels.

Worth Karn, work unit conservationist at Timpas, faced a serious problem on the 600,000-acre land utilization project where few stockmen reside and livestock is widely scattered. Deep canyons were drifted full of snow, making travel hazardous. Karn received equipment and worked almost day and night for 2 weeks, breaking trails, hauling feed, and driving livestock to accessible

spots. His former experience as a cowboy and his knowledge of the terrain resulted in the saving of 12,000 cattle and 6,300 sheep.

The *Bent County Democrat* says that the Bent Soil Conservation District equipment was used in opening roads and trails which resulted in the saving of livestock worth at least half a million dollars, and permitted isolated farmers and ranchers to get food, fuel, and medical supplies. Walter Hopkins, work unit conservationist at Las Animas, was personally in charge of the rescue mission. J. B. McCaskell, district employee, operated the district tractor with an angle dozer, this being the only equipment in the area capable of opening roads. During the rescue mission, the equipment was operated from 11 to 16 hours a day.

More than 200 miles of roads and trails were opened, and between 4,000 and 5,000 cattle, and 4,000 sheep were saved. The rescue party spent nights in schoolhouses, and often lived on Army K rations. Fuel and food were dropped to them by plane. The tractor was without anti-freeze, so had to be drained each night and refilled with melted snow in the mornings.

An estimated 1,200 head of cattle and 3,000 sheep valued at more than $100,000 were rescued through the use of the Prowers Soil Conservation District tractor and another working in the district. The equipment was used full blast for more than a week in breaking trails to marooned livestock, opening roads, hauling feed, and getting food to snowbound families. While about 6 percent of the livestock perished, district efforts greatly reduced losses.

In Huerfano County, M. H. Mickey, work unit conservationist for the Huerfano Soil Conservation District, and O. L. Stancato, another Service employee, were among the leaders in organizing rescue work. They worked almost continually for 10 days, rescuing an expectant mother and 3 people who were critically ill. Food was taken to 20 families, feed to 90 ranches, and 12,000 head of livestock were saved from starvation.

The Purgatoire Soil Conservation District supervisors made their tractor available and it was used for 4 weeks in opening 130 miles of roads. Nick Iuppa and Sam Trujillo, district tractor operators, gave full time to rescue work during the entire period. Army trucks were operated 13 hours a day and delivered 130 tons of feed to livestock. The mud was so deep during most of the period that the six-by-sixes averaged only a mile to a gallon of gas.

Harry D. Petheram, district conservationist at Pueblo, estimated that rescue efforts saved at least 15,000 cattle in Pueblo, Otero, and Crowley Counties. Harry Hauser, work unit conservationist at Pueblo, planned the rescue work, while Tony Martinelli and Gerald Carr, engineering aides, drove trucks during the period.

The Deer Trail Soil Conservation District tractor was used in opening 40 miles of emergency roads. When a county tractor went through a bridge, Jack F. Davenport, conservation aide, drove the district tractor all night, and, after a few hours sleep, worked all day helping to extricate the county tractor. He then spent 11 hours opening roads to starving livestock. District and Service personnel got 3,300 cattle and 1,000 sheep to feed, most of which would have died within a short while. Opening of roads enabled 28 families to reach towns for supplies.

When word came that a farmer had been injured severely when he fell from the roof of his home while removing snow, Orville W. Huscher, conservation aide with the Kiowa Soil Conservation District, and a county employee took a tractor equipped with an angle dozer and worked from 8 p. m. until 2 a. m., opening a road to the injured man's house. After the man was cared for, Huscher and his companion worked 16 hours opening 50 miles of road so farmers could get to town for supplies.

Two tractors owned by the Agate Soil Conservation District were used in opening more than 100 miles of roads, rescuing from almost certain death 4,000 sheep and 200 cattle, and getting 1,500 other sheep and 400 cattle to food and shelter. Food and supplies were delivered to 12 families.

At Simla, Service personnel worked throughout the emergency hauling feed to isolated ranches.

These are only the highlights of rescue activities that centered around soil conservation districts. They show that districts, in addition to carrying on their soil and water conservation activities, also can be of service to their communities in many other ways. The value of the rescue work centering around the districts is evidenced by the fact that, despite the severity of the November blizzard, livestock losses were less than one percent.

As one district supervisor commented, "Soil conservation is our job, but human conservation comes first. Without people, the soil doesn't matter."

Legal Aspects of District Administration

By GEORGE T. MICKELSON
Governor of South Dakota

ABOUT a year ago, the supervisors of a South Dakota soil conservation district had difficulty collecting for some work done with district equipment. The case came to us, since under the law of this State the district may call upon the attorney general for such legal services as it may require. It was settled easily, but it could have had a less happy outcome. Some fundamental contractural and agency principles had been overlooked.

This case put a finger on a vital part of soil conservation district administration, namely, a need for supervisors to understand the legal aspects of their jobs. What happened here led to a scrutiny of the minutes of the meetings of several soil conservation districts, a review of some of their activities, and a review of opinions issued by my office at the request of districts. Evidently, some instruction was called for.

This instruction was given in Souh Dakota. As a result, minutes of the boards of supervisors' meetings have been straightened out. Functions are delegated properly. Contracts for work are in order. The instruction was given at a series of meetings of supervisors at various places within the State. I attended each meeting, described the functions and duties of supervisors and explained how other laws affect them. I also discussed other legal problems with which they were concerned. The question period indicated that these men were anxious to have this information.

Once the supervisors have been put on the right track, it is a simple matter for them to keep the district's legal affairs in order. It requires only the use of common sense; rules to be remembered are few. But if a district gets started wrong, its affairs can get into a muddle. The first thing supervisors should understand clearly is that they

Governor Mickelson.

NOTE.—George T. Mickelson is a native of South Dakota, the son of a farmer, and an experienced farmer himself. He still owns farmland and is engaged in the livestock industry in his home county—Walworth. He received his law degree from the University of South Dakota School of Law in 1927 and immediately returned to Selby, his home town, to practice law. He became attorney general, January 1, 1943, after three terms in the state legislature.

Governor Mickelson, as attorney general, showed a great deal of interest in helping soil conservation districts function properly. His State-wide trip early in 1946 to explain the legal aspects of soil conservation district administration to all supervisors is the first instance in which an attorney general has gone to the field in an effort to help them meet their responsibilities most effectively.

are governed by State laws. These differ from State to State. Next, they should understand their status as government officials and what it means.

South Dakota soil conservation districts are declared by law to be governmental subdivisions of the State, and a public body, corporate and politic. The board of supervisors of soil conservation districts may be compared with a board of county commissioners, and a school board. They are the governing body of the district. They cannot tax, levy assessments or issue bonds, but in doing the things they are authorized to do they have similar responsibilities and enjoy similar immunities to those of county commissioners and school boards.

What does this mean? Probably the first thing to be pointed out—because it was the one in which the largest number of boards were found at fault—is that delegation of functions must be by action of the board and recorded in detail in the board's minutes. Next, the supervisors must act as a board and not as five individuals. Acting on his own initiative, a supervisor has no more right to delegate a function or make a commitment for the district than anyone else. It takes the board acting as such to do those things and assign responsibilities as it sees fit.

Thus, for instance, the minutes must show what authority the board has granted to the treasurer to handle the district's money and make collections in payment for work done and materials sold by the district. Or if the supervisors want some one person to handle its contracts, they must specify in the minutes of the board the scope of the authority that is delegated. Functions not specifically delegated rest solely in the board.

On the other hand, the South Dakota district supervisors are protected from liability in much the same manner as county commissioners. Thus, another set of laws is brought into play by the provision in the soil conservation districts law that a district may sue or be sued.

This is a broader subject and somewhat more technical than what has just been discussed. It need be touched on only briefly here to illustrate the principle. For instance, the district would not be liable for what is known as an "attractive nuisance." An illustration of this would be a piece of district equipment left where it might attract young children to play on it. A private operator if guilty of negligence in that regard would be liable if one of the youngsters was hurt; not so with the county or soil conservation district. Even so, it is wise to insist that employees be careful.

Another instance would be where the board mistakenly made a contract which it may not be authorized by law to make. The rule regarding county commissioners is that it is the responsibility of the other party to know whether the commissioners can legally enter into such a contract. The same is true of boards of supervisors.

Under the terms of the South Dakota Workmen's Compensation Law the supervisors are automatically deemed to have accepted the provisions of the act. It is incumbent to provide compensation insurance.

The issue was raised whether or not municipalities can tax property owned by a South Dakota district. The answer is no, because the districts are subdivisions of State government. It was also held that property bought by a district is exempt from the State sales tax.

There is little excuse for district supervisors having difficulty over contracts. Yet, the incident mentioned in the first paragraph, which arose over work done with district equipment, illustrated an informality that can backfire. The work was in line with the intentions set forth by the cooperator in the farmer-district agreement that outlined the proposed farm conservation plan. It was a type of work the supervisors could legally contract for. Trouble was, no definite contract was made either in writing or verbally. There was no meeting of minds.

Arrangements had been made with the landowner, which was correct procedure. But it was clear that there was confusion as to what was to be done, the amount of work, and the cost. When the equipment arrived at the farm, instructions were taken from the tenant who was not the landlord's agent. And in addition, the differing ideas the landlord and the person acting for the supervisors had in mind about the job led the landlord to claim nonperformance.

The case brought out these things that district supervisors should be sure about. They should be sure that there is a mutual understanding on the part of all parties as to what is to be done, and what it will cost. This need not be a total sum for a job; it may be a specified rate per hour, for instance. And the supervisors should be sure that the person with whom they are dealing has

the right to act. If it is a tenant, be certain that he has authority to represent the landlord.

These contracts need not be in writing, if they are to be performed within a year from their making, although that is desirable. The limited variety of equipment work the district will do for the farmers should make the use of form contracts easy. And it would help to assure that there is full accord between farmers and supervisors.

The same general principles apply to all contracts a district makes, such as for the purchase of supplies and materials, equipment or property, and so on. All contracts should be executed by the districts and the other contracting party.

District supervisors also have some moral responsibility in matters to which they are not parties, namely, to call to a cooperator's attention to steps which must be taken before establishing some types of conservation practices, and to instruct him to get legal advice when it seems necessary. This does not mean that the supervisors should become lawyers. But they should be well enough informed, or see to it that those representing them are informed, to tell a farmer when he should get an easement or a water right and when legal advice should be sought.

Most farmers will be acquainted with many of these things. But it is better in order to protect the reputation of the district and the supervisors to be over-cautious rather than to assume too much. A farmer may know he needs an easement, but it may have slipped his mind. He will appreciate being reminded of it. To other farmers, the information may be news. Check lists of probable legal requirements in connection with different conservation practices would be a help. It may be possible to prepare them.

Let me give you an illustration of what can happen. About a decade ago, a large dam was built in one part of this State. No easement was secured for the spillway and no objection was raised by the landowner affected. The property has changed hands and the new owner is demanding a high price for the land occupied by the spillway and the land over which the water flows back to the natural drainage. There is no chance to get title through adverse possession, that is, by holding the property for a time specified by law. It may cost the owner of the dam quite a sum. Yet, there is no doubt that the easement would have been given gladly and without cost before the dam was built.

Had this been a district cooperator, it seems to me, the supervisors would be under an obligation to remind him to get an easement before he started the dam.

Of course, there will be many questions that the supervisors cannot answer. They should not hesitate to seek advice. During the last year, district supervisors have come to us with problems concerning drainage and the straightening of stream channels. These are complex legal problems and the supervisors were wise in getting information. Now they are forearmed; they can help their farmers avoid complications.

Water rights are another field in which the supervisors should advise cooperators to be sure of their ground. Riparian rights—that is, the rights of a landowner to the flow of a stream beside or through his place, undiminished in quantity and quality—are centuries old. Appropriation of water for irrigation is a more recent development, principally in the western States.

In order to help their cooperators know whether water rights will be involved in a conservation practice, the supervisors should know a few basic definitions. There may be only two or three. One is the definition of a stream in their States; it isn't always one in which water flows continuously. Another is the definition of diffuse water. Then, if a water right is involved, the farmer can be directed to the proper authorities.

The scope of the State soil conservation districts law is bound to broaden the fields in which various district boards will seek legal advice. This has been evident in South Dakota, even though only a few opinions have been issued by our staff. At first, the questions dealt solely with the soil conservation districts law. Then questions which centered on various parts of the soil conservation program began to come up from various districts.

Actually, the supervisors can do just about anything needed to help the farmers and ranchers conserve their soil and water, provided they stay within the framework of the laws that affect them. They are important people. More important, I believe, than most of them realize. Those in South Dakota now know their status and what it means.

Good administration is as necessary as a sound conservation program in maintaining confidence of the people.

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County Attorneys in Vital Role

By MATTHIAS A. THORFINNSON

COUNTY attorneys in Minnesota are making a valued contribution to soil conservation. Although most of their service has been in the capacity of legal advisors, many have gone far beyond this role and have even assisted in district organization. Some were actively advocating soil conservation as far back as the days of the CCC.

The Minnesota Soil Conservation Districts Law names the county attorneys as the legal advisors of district governing bodies. One might think this would be viewed hourly as just another additional chore. Most of the county attorneys look on this responsibility, however, as an opportunity to make a real contribution to the conservation of our greatest natural resource—the soil. They have met with the district supervisors at most of their organization meetings and at numerous meetings later to advise on specific problems. They have helped to set up legal forms for district records, advised on insurance needed where districts were operating machinery, and passed on memoranda and contracts before these were entered into by the districts. They have even helped interpret the districts law for individual farmers who were considering becoming district cooperators, a service far beyond the requirements of the law.

Take the instance of Reuben Nelson, county attorney of Wilkin County at Breckenridge, Minn. At one of the meetings of the board of county commissioners, it was decided to visit the East Agassiz Soil Conservation District in Norman, Clay, and Polk Counties to learn more of what a district does and how it operates. The county commissioners, Nelson, the county engineer, and the county agent all made a tour of this district. This was arranged by N. H. Olson, county agent, at the request of the county board and was conducted by Arthur C. Libby, district conservationist. The group came back convinced of the value of a soil conservation district to Wilkin County and immediately set about to organize a district. A county-wide meeting of town board members and all others interested in soil conservation or drainage was called by the county commissioner at Breckenridge and Nelson took the lead in presenting the proposition to the assembled group, which filled the courthouse to overflowing. At the request of the county commissioners the town boards agreed to be responsible for organization in their townships. Nelson had joint responsibility with the county agent for completion of the job and summarizing of reports. He assisted in the organization of the district governing body, and since that time has been very active in advising them of the legal aspects of the job. He has been instrumental in preparing legal papers concerning grant of access, cooperative agreements, rental agreements, and charge and collection procedures. He has also provided legal assistance in connection with the State laws relating to drainage. He has represented the county and the district in several group enterprise jobs. He has given his time and advice frequently whenever called on, and has provided excellent service in keeping peace and harmony on drainage problems which might not otherwise have been solved by participating farmers and units of Government concerned.

William T. Johnson, Washington County attorney at Stillwater, Minn., has helped soil conservation along in his official capacity and as a citizen. Before becoming county attorney, Johnson assisted in getting a CCC camp into the county to work on soil erosion. As secretary of the St. Croix Soil Conservation Association he wrote several soil conservation articles for newspapers and otherwise publicized the conservation program. He took a hand in launching the Washington County soil conservation district. His predecessor, Milton Lindblom, met with the district governing body and explained its powers and duties. As county attorney, Johnson has met with the supervisors on at least two occasions to discuss the districts law and amendments thereto. He has also interpreted the law for a number of farmers interested in becoming cooperators.

George Tyler, formerly county attorney of Sherburne County, met with the supervisors shortly

NOTE.—The author is extension soil conservationist, University of Minnesota, St. Paul, Minn.

after the district was organized and explained the legal responsibilities of a district.

Walter Johnson, Wright County attorney, met with the supervisors at their organization meeting and discussed some of their main legal responsibilities and powers. He offered to meet with them from time to time to advise on legal questions arising. On the question of possible tax exemption of farm woodlots, for instance, Johnson studied the law and gave the supervisors his interpretation.

In some of the older districts county attorneys have become more active as new problems have emerged.

To get closer cooperation of the Houston County town board, the county commissioners, and the Root River Soil Conservation District, the district supervisors turned to County Attorney L. L. Roerkohl to work out plans with them. It was decided to hold a joint meeting of the township board and the county commissioners, for the purpose of considering the legal aspects of the control of water and debris being sent down every year onto the township and county roads. The purpose was to bring out the legal responsibilities of the farmer, the township and the county board, and to discuss what the Root River Soil Conservation District could do to help solve the problem. Also present were State highway officials, the county engineer, Soil Conservation Service representatives, and the county agent. Practically all of the officials who were invited came to this session.

County Attorney Roerkohl quoted the States laws in regard to control of surface water as related to highways and adjoining farmlands, and cautioned township officers as to their responsibilities and limitations in carrying out control measures on public rights-of-way. He also advised as to the powers and limitations of each of the other governmental subdivisions.

In all the newer districts, county attorneys have assisted the district governing bodies by interpreting the law, checking memoranda of agreements before adoption by supervisors, and advising them as to supervisors' functions and limitations in soil conservation, drainage and flood control projects. A good example is John Walbran, county attorney of Steele County. Walbran discussed the powers and duties of district supervisors and explained that he could advise on the legal steps in setting up county or judicial ditches, but could not represent the supervisors before the county board or before the court.

Harold A. Flynn, Scott County attorney, and John A. Coughlin, Rice County attorney, have discussed the law with the district governing bodies and have given advice on the legal steps in setting up county or judicial drainage enterprises. Flynn has clarified the procedure involved in setting up mutual drainage groups.

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(above)

Root River Soil Conservation District studies problems. From the left: L. L. Roerkohl, county attorney; E. A. Albrecht, vice-chairman; Elmer Thies, board member; John R. Wheaton, secretary-treasurer; Joseph Lorenz, board member, and Frank Ormsby, chairman.

(at left)

Conference in Steele County. From the left: Burton Chambers, chairman of board; John Walbran, county attorney; Ben Kajer, secretary; Carl Hintz, board member; Paul Buecksler, vice-chairman; Charles Belina, treasurer, and J. R. Gute, county agent.

HAWKEYE STATE School Program

BY WILLIAM T. MAAKESTAD
AND MORRIS E. FONDA

SCHOOLS of Iowa are preparing youngsters for their responsibility as caretakers of our natural resources. Soil and water are being featured in Iowa's classrooms as the most fundamental of all resources.

Teaching boys and girls the value of soil and water, and something about how to conserve and use them, has not been an overnight accomplishment. For a number of years the science course as outlined for elementary schools has given attention to conservation. With the advent of the soil and water conservation program county school superintendents became interested, and in 1944–45 there were 25 counties where schools were teaching the subject. Interest of faculties increased the following year, and 33 counties included the teaching of conservation. Toward the year's close the State Superintendent of Public Instruction, Miss Jessie Parker, gave new impetus to the program by suggesting that her new rural supervisor, Miss Ivah Green, might help with a coordinated conservation-education project.

Serving to speed the idea along was a four county meeting in east central Iowa last spring for county superintendents, county extension directors and chairmen of the district governing bodies held for the purpose of discussing how to develop a suitable outline for teaching conservation. George Summers, district conservationist, made arrangements for the meeting. Joining in the conference, also, were Misses Green, I. E. King, assistant state conservationist, and the authors of this article. Farm program directors from radio stations at Cedar Rapids, Marshalltown, and Waterloo took a lively interest in the points at issue, pledged their stations to doing everything possible to help the educational program along.

Conservation education, soil and water conservation teaching and many related aspects were covered. As a first step, it was felt that a uniform outline which all of the four counties could use would be needed. Misses Green, King, Summers, and the assistant extension soil conservationist, were designated as a committee to prepare such an outline.

Told of the proposed plans, the State Superintendent of Public Instruction, suggested, instead, that a uniform outline be developed for all counties of the State. This led to five county superintendents from various parts of the State being added to the committees; all of them had had some experiences in teaching conservation. The first meeting of the group was held early in the summer, at which four objectives were set forth and appropriate action suggested. The objectives—

1. To prepare material which would be part of the regular science course rather than add a new and separate study to an overloaded curriculum.
2. To revise the science course on a 3-year cycle, providing one or more units in conservation each fall, winter, and spring term.
3. Because of immediate need for information on soil conservation, it was decided to prepare five units on this subject which would serve as the science lessons during the fall of 1946.
4. To have the eighth-grade examination questions next spring include questions on conservation topics.

In addition, the committee urged that emphasis be placed on in-service teacher training by means of field tours, workshops, conservation talks, use of visual aids and other devices.

NOTE.—The authors are, respectively, assistant extension soil conservationist in Iowa, and head of the section of education, Soil Conservation Service, Milwaukee, Wis.

In some instances, local groups are sponsoring and actively helping with teacher training. One example, among many, is the assistance given by the Shelby County Bankers Association in cooperation with the soil conservation district. Bankers and district arranged for transportation and lunch for 127 Shelby County teachers visiting the experiment station at Clarinda. Supt. F. E. Brouhard led the teachers, as Dr. G. M. Browning, of the Soil Conservation Service, research staff, and Dr. M. L. Peterson, of the Farm Crops Section, Iowa State College, explained the investigations carried on at the farm.

The Department of Public Instruction is taking the responsibility of leading the program. In the forefront, too, are county superintendents, district governing bodies, the Extension Service, and the Soil Conservation Service, and many local groups. The assistant extension soil conservationist has worked with most of the county superintendents on this program.

Today, the teaching of conservation in the schools of Iowa is a reality. A recent survey shows that 93 of the 99 county superintendents already are using the State outline, with their teachers actually teaching conservation. When 400 rural teachers attending the last State teachers' conference were asked how many were actually teaching conservation, over 90 percent replied in the affirmative.

With the purpose of helping teachers to become better acquainted with conservation, technicians of the Soil Conservation Service and the Extension Service are meeting with a diversity of teachers' groups. So far, 47 counties have received assistance from these 2 agencies at various gatherings. In addition, the regional office of the Soil Conservation Service at Milwaukee has furnished teaching aids and materials and has suggested numerous ways to implement conservation into the regular school courses.

An upsurge in the teaching of soil and water conservation is gratifying in itself, but the larger dividends will be the conservation-mindedness of our citizens of tomorrow—the boys and girls who are being developed in the schools of Iowa today.

(*Continued from page* 179)

The Cottonwood County attorney has helped in similar ways.

Glenn C. Sawyer, Fillmore County attorney, met with the boards of supervisors at their organization meeting and reviewed the State law as it defines their duties and responsibilities. He also has assisted the boards in preparation of newspaper notices for elections, and has advised them on paying insurance for the operation of equipment.

Thomas J. Scanlon, Olmsted County attorney, assisted the boards in obtaining proper insurance when operating a tiling machine, and in preparing the form of receipt used with cooperators from whom they collected money.

Milton I. Holst, Goodhue County attorney, and Arnold W. Hatfield, Wabasha County attorney, met with all district supervisors in their counties to explain the soil conservation district law. They also checked over the district agreement forms.

These are but a few examples of how county attorneys are making themselves helpful to the 31 districts already organized in Minnesota.

Shelby County teachers at the Soil Conservation Experiment Farm near Clarinda, Iowa.

SOIL CONSERVATION in Our Democracy

By H. C. BYRD, President, University of Maryland

MY GRANDFATHER was a sea captain. My first thought about soil conservation came when, strolling along the river shore one day, he pointed out to me where, when he was a boy, his father had anchored his ship. The water was hardly deep enough to push a small flat-bottom skiff. Then he pointed out a place far out in the water where he said a house used to stand, where fig trees had grown in the yard, behind which in the evenings he had spent his time at home hugging a good-looking girl, who later, it happened, became my grandmother.

In a boyish way, I wondered where the land that once had been there had gone, and what had become of the deep water where ships had anchored.

Recently, in driving an automobile across the United States, I saw, along the Mississippi, the Missouri, and the Platte, and in many other places, recent and more serious evidence of the ravages of erosion.

In the light of what modern day science has taught us about values that lie in the soil, it would seem that we can give new meaning to the words of Genesis, which give man his beginning out of the soil. When we consider that our very existence depends upon the minerals that plants draw from the land; when we know that we must give back to the soil those values that are taken from the soil by plants and consumed by us, something of new meaning may be read into the words, "For out of it thou wast taken, and dust thou art and into dust shalt thou return."

IT IS not my purpose to talk largely about the values in our soil. You, perhaps, know far better than I that soil gives to the plants that grow in it only those food values that the soil itself contains. Nothing could be more wrong than for some of our nutritionists to say, "Drink a pint of milk, eat an egg, eat some fruit, eat some green vegetables and you need never worry about your health." There is no particular apparatus in a cow's biological machinery, for instance, to produce phosphorus and calcium in her milk, unless that phosphorus and calcium was in the hay or pasturage or other feed. Sometimes I think that the butterfat test in milk might well be supplemented with a test as to the amount of calcium and phosphorus milk contains. Copper, iron, cobalt, magnesium, potassium, silver, sulphur, and other minerals that our body requires will come to us through the plants we eat only if they are contained in the soil in which the plants grew. It is difficult even to conjecture the extent to which soil depletion, in other words a lack of soil conservation, has affected the course of history. It would take a tremendous amount of research to determine the numbers of people who have migrated from one part of the earth to another in search of land rich enough to sustain their lives. We know that nearly 2,000 years ago, under Rome, there were certain sections of what is now Italy in which birth rates declined in the rural districts to such an extent that bounties were offered for every child that was born. It is believed that these birth rates declined largely because of soil depletion, which took from plants the procreative elements which are necessary to propagation of the human species.

The northern shores of the Mediterranean could no longer support their populations satisfactorily after the Romans had denuded the forests; and, to this day, I understand the shore lands of Yugoslavia are almost barren because no system of cultivation has been devised to prevent rains from constantly washing away the top soil. Canaan was no longer a land of milk and honey when the forests were destroyed and the subsequent irrigation systems failed.

It was not without basic reason that Cicero uttered his famous, "Carthage delenda est." Carthage then was the center of the richest wheat growing section in the world. Roman soils had been depleted and Carthage was the granary that furnished Rome and Southern Europe with its bread. And recently, in all probability, this was the chief reason why Italian and German eyes were cast in that direction. The top soil of Tunisia was the objective

NOTE.—Dr. Byrd delivered this address at the First Annual Meeting of The Soil Conservation Society of America, December 12, 1946.

in the last war just as much as it was when Rome and Carthage fought; and, while in this world of problems and difficulties it is not safe to make many predictions, I would not hesitate to indicate that Great Britain, in one way or another, will retain her present hold on that same territory and for the same reason. Who holds the lands of Tunisia will come close to feeding the hungry mouths of Europe. Not only are the lands of Tunisia a source of power, but they are also a source of profit.

As GOD commanded in Genesis, the earth brought forth "grass—the herb yielding seed, and the fruit tree yielding fruit after his kind, whose seed is in itself," causing plants thus to perpetuate themselves; but these plants will not bring forth any more in the way of food values, so far as minerals are concerned, than the soil itself contains.

In our diets we may get the fats and all that is necessary to make us seem to be in good health, but if we accept the thesis that plants, because they are of a certain variety, contain all that is necessary of certain food values, which actually they do not contain because these values were not in the soil in which the plants grew, we are probably missing some of the elements, the absence of which creates diseases and destroys health.

It is impossible for us to say definitely that the great percentage of rejections due to physical inability in the second World War, as compared to the first, were due to depletion of food elements in our soils, but it would be extremely difficult to find any other reason that would be responsible for such a Nation-wide and general condition.

It is not necessary to talk about soil depletion in relation to our farm income. We know that a rich and fertile soil means an income for our farm peope which will raise their standard of living and which will create a buying power in agriculture which is the basis of our national economy. It is true that when agriculture is prosperous, the nation is prosperous; because agriculture furnishes such a large percentage of the basic raw materials on which our industries depend. Fertile soil means prosperous farms and prosperous farms mean a prosperous and sound nation. And, to carry this a little further, it is likely that a prosperous nation means a sound government.

BUT, say some, the conditions on the farms and the matter of depletion and loss of soil is something for the farmer to worry about and not for the cities. Well, Dr. Hugh Bennett not long ago made a speech before the Kiwanis Club of Baltimore in which he produced facts and figures which indicate the extent to which the cities, particularly our seaports, are, or should be, interested in soil conservation. Dr. Bennett astonished Baltimoreans by some of the figures that he used to show Baltimore's financial interest in this work. In the small Baltimore harbor alone, the channels have been kept open only at a cost of $17,000,000 spent by the Federal Government, in addition to the millions that have been spent by private concerns and by the city itself. Probably 20,000,000 cubic yards of sediment have been removed from the Baltimore harbor, and this sediment was largely top soil that came from Maryland farms. In other words, Maryland farms thus lose their productivity, and to remove this silt from the harbor costs millions of the taxpayer's money.

The natural question that arose in the minds of those Baltimore businessmen of the Kiwanis Club was, "Why is not it a profitable thing to teach Maryland farmers to practice conservation on Maryland farms to prevent this waste of Maryland's topsoil, and by so doing, preserve the economic worth of Maryland's farms and, in addition, prevent such large expenditures of money for dredging?" The same question and the same condition would be applicable to many other States and many other cities of America; in fact, to practically all of them.

It does not take any great mathematician to figure that with profits at one end, and savings at the other, the soil conservation program would pay for itself and be profitable to everybody.

THE welfare of every individual will in the future depend upon the productivity of the soil. We have been a profligate nation. We have depleted our natural mineral resources to such an extent that the end of most of them is in sight. Much of what we have in mineral resources we have been, and still are, giving away. All that we shall have left is our land. That land must furnish to us the food which means existence and health. It must furnish to us the fibers, the other varied products of one kind or another, out of which we shall manufacture our plastics, our clothing, and perhaps our medicines. Yes, man is so basically tied to the land, the state of our nation is so much dependent on the soil, that it seems to me the greatest basic problem we face is to tie society to the land, to make

Dr. H. C. Byrd, president of the University of Maryland.

our citizenship fully conscious of the real meaning of the words, "From dust thou art."

What are we doing about it, and what can be done? Well, we are doing a good deal: We can, and must, do more. In fact, we have got to do a good deal more.

We do not want, some day, archeological researchers, digging into the rubble of one of our ruined and long forgotten cities, to pender over the results of the ignorance of a people who neglected their basic resource.

When the State programs of soil conservation were first undertaken, I believe that the Soil Conservation bill, written largely in the U. S. Department of Agriculture and introduced in the Maryland legislature in 1937, was one of the first in the country. I shall never forget the words of my friend, O. C. Bruce, who came to me and said, "This bill has been introduced, but it will only go through if you take hold and guide it." Well, I thought at the time that any bill on soil conservation ought to have easy sailing. However, toward the end of the session, the Chairman of the Finance Committee of the Senate sent for me and, taking this bill out of his desk, said, "Curley, what kind of a thing is this anyway? Is this yours? Why, it sets up local governments within the county governments and extends powers beyond anything that the State ever has extended to groups of people in this State. I think we ought to kill it." My reply to him was this, "Would you deny the right of our people in different sections of the State to organize themselves into groups for their own betterment, with the main objective of protecting the basic economic resource of the State? If so, you deny to them the very elements of democratic procedure."

The bill passed, and shortly after the session, went to the Governor for his signature. The lawyers advising the Governor indicated to him that the bill was too far-reaching and should be vetoed. Our people interested in soil conservation asked for a hearing. At the hearing, the lawyers who were present advised the Governor strongly against signing the bill, their reason being that it was too far-reaching in its provisions, that it set up governments within governments, etc. The Governor then turned to me and said bluntly, "What do you know about this and what do you want to say about it?" Laughingly, I said, "Well, Governor, I don't wonder that the lawyers are opposed to this and say it should not be signed, because about all that most of these lawyers know about our economic life is to try to keep some of us out of jail when we go wrong, and they don't always succeed in doing that." Then, seriously, I said, "It is useless to try to go into all the merits of this bill this afternoon. There isn't time. But every law is just as good as its administration and I pledge you that if you sign this bill you will be doing the biggest single thing that any man has ever done for agriculture in Maryland, and I will pledge you that it shall be administered in such a way as to be a credit to you and to your administration." The Governor signed the bill and it became the soil conservation law of Maryland. Today the districts organized under that law cover almost the entire State. There is no other work in the State which has occasioned so much generally favorable comment. Soil conservation in Maryland has come to stay. We are on our way to great and abiding developments in the protection of our land, to the ultimate profit of our entire citizenship.

So apparent is the need for soil conservation that I wonder that all our people do not "get up on their hind legs," to use a colloquial Eastern Shore of Maryland expression, and demand that depletion of our lands cease and that methods be employed everywhere to preserve the fertility of the land. If our nation's prosperity, and consequently sound Government, depend on the land, you may be certain that, if our soil resources be depleted to a point where they are unable to support our people in health and prosperity, the end of democracy in America will be at hand. If we are going to save our democracy, if we are going to preserve the integrity of our representative kind of government, it must be done by conserving our basic resource, the soil. The welfare of our people, the stability of our government, and the conservation of our soil, are so irrevocably bound together that if the base of the structure, the soil, fails, the whole structure will fall.

It is not far fetched to consider that we shall have more people than our land can feed. I am told that the awful poverty of Japan and China today rests upon this factor. Recently, I had a letter from my daughter in which was the following sentence: "Until the ship docked at Japan and put garbage cans over the side and I saw hundreds of people literally fight to get at those garbage cans for food, I never knew what poverty meant."

China, I understand, has starving millions, entirely because a small proportion of its lands are under cultivation. Japan reached out for more land in order to feed its millions. Japan was thwarted, but it is inevitable that its millions must be fed, because when people are starving, they will do anything for food.

We do not want depleted lands in this nation to develop such a condition here, and we want our government to continue in its present form. No nation, no people, ever flourished since the beginning of recorded history after food and vital necessities began to disappear. Then it is that those who control foodstuffs and distribution become rulers. If that time comes, our people will no longer be free. Russia calls it communism, Italy called it fascism Germany called it naziism. We may call it regimentation But whatever it may be, if that condition comes to pass, it will not be democracy as we understand it.

You agree with me, I know, that we do not want our soil resources to vanish, whether it be through overcultivation, through failure to return to the soil minerals which plants take from the soil, or whether it be through soil erosion, or any other reason. We cannot countenance depletion of our soil unless, at the same time, we countenance the destruction of those factors that are basic in our national life. We cannot maintain our high living standards if our productive lands are allowed to disappear, while, at the same time, our people become more numerous.

We are making, through public health measures and medical research, every possible effort to advance the length of our lives. I doubt if our democratic government would tolerate measures to decrease or limit population. The only sure way to safeguard our situation as a people and as a nation is to safeguard our soil.

The Soil Conservation Society of America is a new organization, but, no organization ever started in a field in which the possibilities of achievement were greater. I

believe that we are laying the right foundation for an enduring and vital program, but the task has hardly begun. Ahead lies a job of such magnitude that it is difficult even for us to grasp and particularly will it be hard for those who know little of the tie between the soil and the national economy.

A member of our Board of Regents, once, in questioning the type of work that was being carried on, and in questioning me on the effectiveness of the work, took me to a farm on which various kinds of soil conservation demonstrations were being conducted. He said, "So much money has been spent here that it is more than the whole farm is worth," which was true, in all probability; but what that member of our Board failed to grasp was the effect of that demonstration when it began to be translated to actual practice on many, many farms. And so you, in carrying the gospel of soil protection into your communities, and into various parts of this country, will find many "Doubting Thomasses." Let me entreat you, though, to carry that gospel just the same and let that gospel carry, as a basic fact, the word that problems of the land do not stop at farm, county or State borders, and that soil depletion, from erosion or from any other cause, affects us all, regardless of faith, race, creed, or political affiliations, irrespective of whether we be bankers, business men, professional men, or farmers.

IN THE BEGINNING, many of us were slow to accept wholeheartedly a few fundamental truths. We did not learn easily the lesson that education alone would never get done the job of soil conservation. We had to learn that money must be spent for a demonstration program that would point the way. We had to find out for ourselves that isolated action in scattered areas could not be substituted for cooperative community action, if a community, state, and national problem were to be solved.

But through these tribulations, through the processes of learning by experience, in my opinion at least, soil conservation has at last found a permanent place in our community and national life. And in finding this permanent place, through the rigors of tough experience, the beginning of soil conservation work has produced the finest basic example of democratic action in the agricultural history of this nation, namely, an effective, coordinated, program through the organization of soil conservation districts.

Having been instrumental in getting the Maryland legislature to pass, and the Maryland governor to sign, our soil conservation bill, which became the conservation law of Maryland, I should like to talk with you a few minutes about how these districts have fitted soil conservation into our representative, or democratic, form of government.

As a starting point, we knew that if soil were to be conserved, the farms and the farm owners of America would have to be the basic instruments to be used for that purpose. In addition to this, we knew that, under our way of living, any effort to force farmers into soil conservation practice would be a violation of our democratic principles, and would be certain to fail. No farmer can be commanded or forced into anything. His native and sound intelligence, though, make him quick to discern intelligent and sound leadership. It was evident that if soil conservation efforts were to succeed under such premises, that it must be on a purely voluntary basis. A voluntary act meant cooperation under local government; that is, under local organization created by the people.

On such democratic principles was evolved, through the organization of the Soil Conservation District, the most far-reaching program that has ever taken place in our democracy; and the program is growing with remarkable rapidity. I know of nothing else in our agricultural history quite like it.

THE soil conservation district is getting the job done in a thoroughly democratic way. Perhaps the most important reason is that the governing bodies of the districts, usually farmers themselves, coordinate the activities of local, State, and Federal agencies, which cooperate, into a completely integrated program that eliminates duplication and overlapping. That function of coordination represents, to me, one of the truly great aspects of the soil conservation districts program. It has brought about a spirit of cooperation among organizations and agencies that in many instances had existed previously only on paper.

Let me carry that thought a little further. A soil conservation district comes into being only at the will of the people of a community. The first job is to prepare two highly important documents—a program, which spells out the job that *needs* to be done, and a work plan, which outlines *how* the job will be done. The latter plan—how the job is to be carried out—is where the coordinating function of the district begins, for it specifically names groups, organizations, and agencies, and the assistance each has agreed to provide.

Think about the significance of this kind of cooperation. Here is a group, duly organized by a democratic process under a State law, which says, in effect: "Here is the job; here is what the Extension Service, the Soil Conservation Service, the Farm Bureau, the Grange, the county commissioners, the State Forestry Department, the schools, the civic clubs, the highway department, the garden clubs, the sportsmen's clubs—and so on—are going to do to help us get the job done.

Such action represents democracy in fullest flower. It represents a spirit of cooperation that has evolved through common interest in the soil.

We must not permit ourselves to be satisfied with the progress soil conservation has made. True, we have come a long way, but the major part of the tremendous task lies ahead. We must think about ways and means of doing the job faster and better.

EDUCATION in soil conservation can be the biggest help, or lack of it, the worst barricade, on the road to complete understanding and adoption of methods to save our land. Let's admit that a big job has been done in conservation education, or else the tens of thousands of farmer-cooperators in the more than 1,700 soil conservation districts would never have become interested. In all of the States, however, there are other tens of thousands still to be convinced that they need soil conservation on their farms.

The educational job in districts already formed, and in communities where districts should be organized, is primarily the task of the Extension Services of our Land Grant Universities. In many communities these hard-pressed and earnest men and women of the Extension Service have recognized the soil conservation district for what it is—a mechanism to get concerted action to conserve our basic resource—and have spared no effort to help organize districts and help them operate successfully. In other areas, we must admit, the job has not been done so well.

In general, though, our agricultural educators have done their jobs successfully. But we must intensify and speed up our educational processes so that conservation can be put into effect more rapidly and in broader areas. We are moving fast, but not fast enough. I believe education is the principal bottleneck. In that connection, I commend to you a splendid address on the need for conservation education by Dr. R. K. Bliss on the occasion of his retirement after many years of distinguished service as Extension Director at the Iowa State College. Dr. Bliss, may his tribe increase—understands the problem of conservation education as few people do. I am pleased to see his name on the program of this conference.

Now may I say a word about what the States can do to help soil conservation in our democracy. I believe it is a State responsibility to provide financial aid. As I see it, the State legislatures can best contribute by providing funds for sorely needed heavy equipment, for the payment of necessary expenses of district governing bodies, for the printing of educational literature and the procurement of motion pictures and other educational materials the districts need. The State governments, I believe, should also give a clear mandate to all their agencies and departments to cooperate fully with the soil conservation districts.

I would like to see intensified activity on the part of the 48 State soil conservation committees, commissions, or boards that are set up under the various State laws. Here are groups that can provide greater guidance to district governing bodies, help them recognize and assume their responsibilities, serve as a medium for the exchange of information and methods, and be their articulate spokesmen on legislation and other matters. At this point, let me observe that it is well that governing bodies of districts are forming State-wide associations, and that the State associations are coming together in a national organization. This, I think, is a fine thing for action under a democratic government. In unity there is strength and progress. Incidentally, what could be more inspiring than the selfless leadership of the more than 8,000 district supervisors or directors who labor at great personal sacrifice that their neighbors, their community, their State, and their Nation may benefit?

The Farm Bureau and the Grange in our State are wholeheartedly behind soil conservation work because their membership is made up of the people who know what is being done, and why. Recently, a local Grange presented the following statement at the meeting of the National Grange:

"Soil conservation programs already have yielded returns far above the expenditures made for soil building practices, developing sound conservation methods, and establishing soil conservation districts. They should now be extended further to broad natural areas where it is beneficial to do so. As further progress is made with soil conservation as a national policy, the programs in their broadest application should tend to become self-sustaining."

Besides this, the Maryland State Grange passed the following resolution:

"Having supported the inauguration of soil conservation work in the State and the passage of the Soil Districts Law in 1937, the State Grange wishes to commend our State authorities and the University of Maryland, in cooperation with the U. S. Soil Conservation Service, for the splendid progress being made. We wish to commend the Board of Regents of the University and the Governor of the State for the increase in support of this work by the last State budget and urge that increased funds be made available in the future to assist the Soil Conservation Districts in the promotion of this important work. We also urge our representatives in Congress to provide adequately for the U. S. Soil Conservation Service and maintain its identity in the U. S. Department of Agriculture."

The State Farm Bureau also passed a similar resolution.

Big soil conservation rallies also have been held in the State, at which the work has been highly commended and plans made for future developments. Maryland is heart and soul with the soil conservation program, because through its democratic procedures the people of the State know and understand what it means.

Now I come to my final major observation concerning the acceleration of our program. Let me say first, and frankly, that we must have a continuing aggressive national agency devoted exclusively to the problems of land conservation. We have that now in the Soil Conservation Service. The job is too vital, too complex, and too basic ever to become a sideline to another activity. We cannot permit the national job to be split into segments, or to be subordinated to a variety of other agricultural programs. Ever so often you hear rumblings from Washington that the Soil Concervation Service will be made a part of the Extension Service of the Land Grant Colleges. Or you hear that it will be put under the Production and Marketing Administration, or, that it will be a part of the AAA or that some other administrative disposition will be made of it. Let us remember that the Soil Conservation Service is basic to our national welfare, is necessary to the social life of our people, and, consequently, is sufficiently important not to become a subsidiary part of any other service.

If work experience means anything, I can say to you that, in my opinion we have done a better job in Maryland than we would have done had the Soil Conservation Service been a part of our Extension Service; and I am certain that we have done a better job than we would if the Soil Conservation Service had been a part of the AAA or a part of any other unit of the Federal Department of Agriculture.

Personally and officially I find myself in a harmony with that great American whose booming voice for 30

years has preached the doctrine of soil conservation. The vision of this prophetic leader has culminated in a vigorous organization which has approached its tremendous task as few Government agencies have ever done—in a thoroughly democratic way through the local communities. I refer, of course, to Hugh Hammond Bennett. To Hugh Bennett our democracy owes a great debt—one that posterity will appreciate more fully than we. Hugh Bennett had a vision. The result of that vision will be more far-reaching than any of us here today could possibly conceive. A half century from now, this man's name will be written in history as one who foresaw the greatest need of his country and as one who had the courage to initiate the action which met that need.

No more cooperative agency of the Government ever existed than the Soil Conservation Service. Its research is coordinated with the States. Its technical assistance, without which we would have no national soil conservation program, is given exclusively through locally organized, locally controlled soil conservation districts—and then only at the invitation of the leaders of those districts. Yes, the contribution of the Soil Conservation Service has been magnificent. Soil conservation in our democracy cannot continue without such technical help, which no other agency is equipped to provide.

But may I again emphasize that we are moving fast but not fast enough. As with better conservation education, with increased State appropriations and participation, with more activity on the part of the State soil conservation committees, so, too, do we need to accelerate technical assistance to the farms in districts. We need to devise better techniques, faster procedures, but we must not sacrifice quality. The science of soil conservation is not a formula program that can be applied indiscriminately to all farmlands; it is based on the concept that every acre has a proper use and must be treated according to its needs and capacity for production.

It has been a signal honor to speak to you at this first annual meeting of a new society dedicated to the advancement of the science of soil and water conservation. I am appreciative of the opportunity to convey to you my thought that our free society could not survive the loss of its basic, irreplaceable resource—the soil. After many years of trial and error, we have laid a firm foundation for a national program. Let us now build upon that foundation. Soil conservation in our democracy is an infant in swaddling clothes. Through cooperative, progressive, dynamic, methods, we must nourish that infant into a hardy, mature citizen for the everlasting benefit of posterity.

Let our vision never be clouded by inconsequential or extraneous issues. Let us have the courage that is the need of every great enterprise. Let us work under the ever present stimulus that we are safeguarding the future of our children and building security for America.

Districts Provide a Pattern of Thinking

By Ayers Brinser

I CANNOT ESCAPE the conviction that the lasting importance of soil conservation districts to Massachusetts farmers is not the yards of stone wall pushed into a ditch nor the acres contoured, but the way they can clarify and expand the whole pattern of our thinking about land use. An idea of this sort can be much more concrete than any amount of loose talk about bulldozers and early cut hay. The fact is that timid though we may be about ideas, it is ideas that govern what we do, the way we do it and, most important, why we do it.

You might say that the soil conservation district is a kind of lens which brings all parts of the picture into a clear focus. Farm programs in the past were specific and technical. They had little to do with the idea of farming. They were primarily concerned with better crops, better herds, and higher prices. Each in itself was extremely important to the farmer but they were not necessarily related. Soil conservation districts are based on the idea that successful farming and successful farmers are dependent on a balanced and carefully integrated program for the whole farm. They emphasize the relationship of the programs.

The first practical application of the ideas of the soil conservation district is the farm plan. The farm plan is no more than an estimate of the land resources available to each of us on the farms we occupy. It shows us what these resources are and how they may be used so that they will produce to their fullest capacity. It is the blueprint on which we can build future production.

It is perfectly true that soil conservation districts do not automatically create perfection. It cannot be repeated too often that the soil conservation district is an opportunity to do a job for ourselves. It is a cooperative effort in which we are the most important cooperators. It is up to us as farmers to see that soil conservation districts really do the job for which they are designed. A district is not a gift on a platter. It is a plan of work in which each of us must do our full share.

NOTE.—This is a condensation of an address given during Farm and Home Week at Massachusetts State College. Mr. Brinser is a Supervisor of the Northwestern Worcester County Soil Conservation District.

It requires understanding, patience and, above all, participation.

I should say that conservation implies wise and permanent use by human beings. Therefore, we can broaden our concept of soil conservation districts to include not only preserving the soil but fitting it for the widest possible use. By use, I do not mean exploitation by one generation but permanent use for as long as men depend on the land for life, and that promises to be a long time.

I believe that grass is the most important single natural resource in New England. By raising better hay, better pastures, better poultry ranges, we can reduce our dependence on imported grains. If you agree with me that grain shortages are not temporary but are rather the result of the growing livestock industry in the grain-producing west, then I think you can see how important better grass is to New England. The soil conservation district, by making possible the better use of our land, increases our supply of forage. In other words, it gives us the opportunity to do more farming. After all, the basis of agriculture is land use. Good land use means getting the most value out of the land on a permanent basis. There is no short-term value in agriculture.

It will be very difficult to justify, under any sound land use program, our acres of pasture full of hard hack and our hay fields of June grass and white horse. Better grass means cheaper milk and cheaper eggs. By keeping up our volume and reducing the cost, we are fulfilling our job as farmers. We are giving more people the food they need at a price they can pay. For the orchardist and the market gardener, the soil conservation district, with its possibilities of contouring and drainage, offers the same hope of more for less.

I do not think that we should expect to justify higher prices for New England milk, eggs, fruit, and vegetables than those of products of similar quality shipped in from other areas. Any artificial means to maintain a false price will be bound to fail. If a Wisconsin farmer, raising his own grain, can deliver milk in Boston for less than our cost of production, our job is not to devise some subterfuge to keep that Wisconsin milk out of New England, but rather to find the way to make our milk cheaper than his. I think those ways can be found through the full utilization of the soil conservation district program.

What is projected here is not a temporary solution to a temporary shortage but rather a long-term program to meet the continuing problems of New England agriculture. I believe that with a sound program of land use, making soils more productive, adapting fields to machine culture, and improving the quality of our herds and flocks, we shall be able to compete successfully with any other area in the United States. Furthermore, I think the basis of that competition will be on the very sound foundation of more abundant food at lower cost.

In our so-called industrial society where there is so much emphasis on machinery, cost of production and man hours, there is one very important point we are apt to overlook. The great contribution of the machine is time. It does not create anything. If a machine will make as many safety pins in an hour as a thousand men will make in the same amount of time, all that machine has supplied is a thousand man-hours. As long as no one has lived those hours, the work man-hours is a meaningless statistic. Machines simply give us more time in which to live in a way we may prefer. As a nation we have become so devoted to the machine that we assume that life begins with the internal combustion engine. As a farmer, I feel confident that compared with the cow a carburator is neolithic.

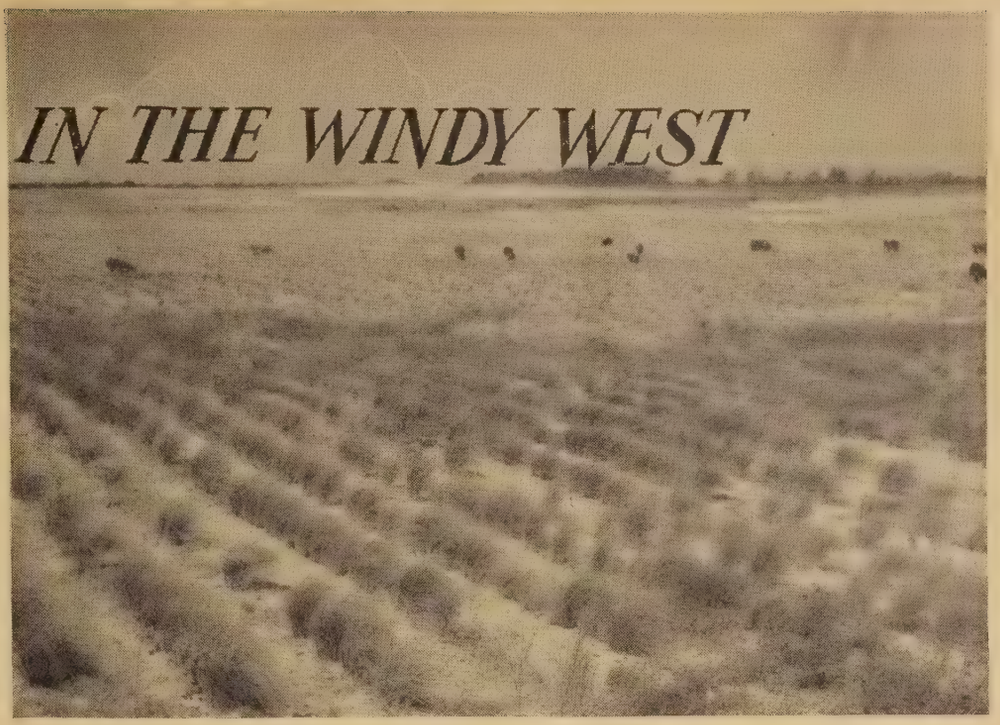
Agriculture creates the basis of life. A man who raises an acre of corn is, by his labor, making life possible. In other words, the farmer works with the processes of living. In doing that he is unique among all other people who work in our civilization. It seems to me that one of the chief reasons people elect to be farmers is that their greatest satisfaction comes from playing a large part in the creation of life.

All forms of life live together in a balanced association. As an example of this, some years ago some very kind-hearted people became very agitated by the number of elk slaughtered by mountain lions in the Kaibab National Forest. A noted hunter was dispatched to the area. He succeeded in polishing off practically all of the lions. The result was that the elk multiplied so rapidly that forage in the forest was depleted and thousands of elk died of hunger. This is an extremely simple application of the problems of balance in nature. The intricate relationships of living things extends all the way from human beings to the fungi and micro-organisms in the soil. We have all observed how legumes will grow in one kind of soil and not on another.

(*Continued on page* 191)

Lovegrass IN THE WINDY WEST

By Clarence Bunch



On Wadley's farm the lovegrass provides excellent grazing, hay, and additional income from seed. In the background, just under "Windy West," topsoil can be seen blowing from a neighbor's field not under soil-holding cover.

HENRY WADLEY, Negro farmer of Geary, Okla., planted weeping lovegrass on his hands and knees with a pepper shaker in a prepared plot 128 feet long and 36 feet wide. Wadley knew that people would think him crazy if they saw him going through such queer maneuvers; so he prepared the experimental plot where he thought he would be concealed from view by trees and shrubs. But he was seen anyway, and word got around. There were those who did wonder if Wadley might not be a little "touched."

Wadley laughs about it now. That little plot of weeping lovegrass showed him how he could save his farm from wind erosion. He planted it with a handful of seed received from the Soil Conservation Service. That was 3 years ago, shortly after he had become a cooperator with the Central North Canadian Soil Conservation District. Like many another farmer of the area, Wadley had been losing topsoil through wind erosion. When exposed, the light, sandy soil of this part of Oklahoma is peeled off and blown away by the wind that comes with certainty every spring and occasionally at other times. Productivity of the farm had declined to a low level, but a coordinated soil conservation program now has brought his land back to a paying basis in three years.

In addition to tieing his land down with weeping lovegrass, Wadley uses crop and pasture rotations, grows soil-improving crops, and strip crops. He planted a windbreak. To round out his coordinated program, Wadley still has a few moves to make, one of which is to provide water facilities for his cattle.

But it's the weeping lovegrass about which Wadley most likes to talk.

"That little plot of land that I planted with a pepper shaker put me in the lovegrass business and I'm in it to stay," he says, "That's the only thing to stop the blowing of soil around here. It's a hardy plant, this lovegrass, good for our sandy soil, able to get along in hot or cold weather. It stops erosion.

"Lovegrass makes good grazing, cattle like it. In the fall and winter my cattle walk over wheat to graze the lovegrass. It's the first grass out in the spring—it gets green in February—and it stays green even through hot, dry summers. If snow doesn't cover the ground, I can pasture it all the year around. Of course I have to give my cattle some supplemental feed in the winter, usually a pound of cotton meal cake per head daily for 3 months, November to February."

When Wadley saw what the weeping lovegrass did in his little plot, he paid $90 for a small sack of seed (the price has ranged from $5 to $8 a pound). When told what the sack cost, his wife exclaimed: "My land, what's in there, gold?"

"I told her it was as good as gold," Wadley answered.

Wadley planted one-third pound of seed per

Note.—The author is soil conservationist and work unit leader, Soil Conservation Service, Geary, Okla.

acre. He now has 45 acres in weeping lovegrass. The past summer he had a herd of 30 head of Hereford cattle, a herd built up from 1 cow bought when he married in 1928. He now has his own registered bull. In midsummer he marketed 10 calves at an average price of $87 each.

About the first of August, last year, Wadley put his 30 head of cattle in a 30-acre field of weeping lovegrass. If snow does not bury the field, the cattle will be kept on this pasture through the winter, he said. The cattle graze the lovegrass until noon each day, then go a mile for water, remain in the shade near the water and graze a nearby 16-acre field of sudan grass in the afternoon.

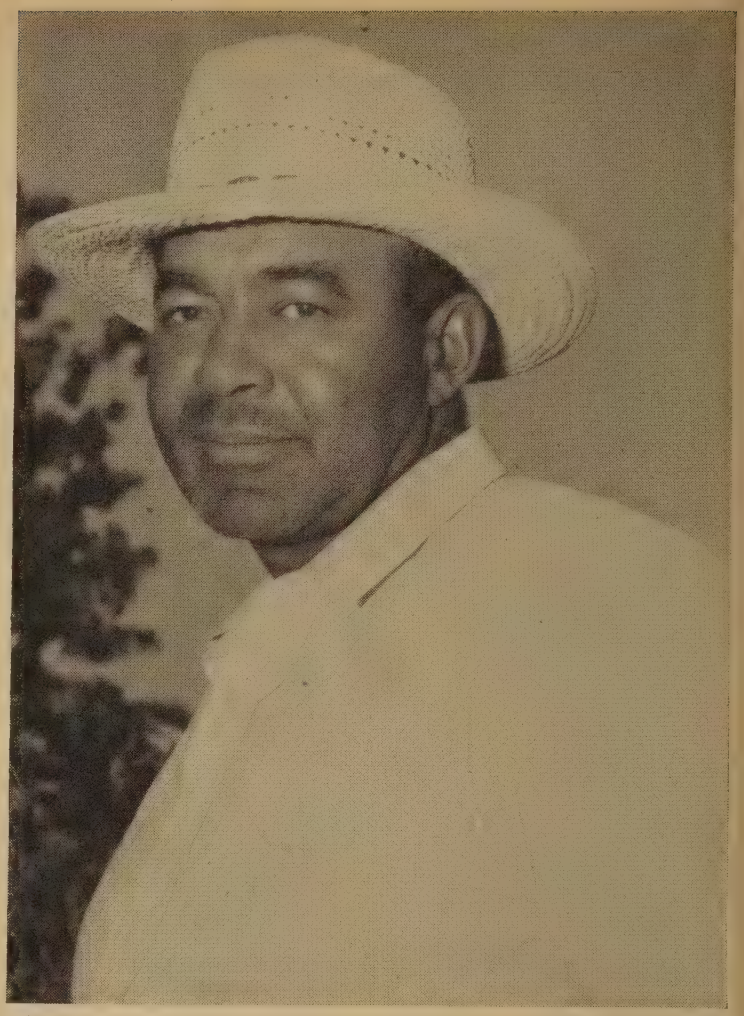
In 1946 Wadley harvested seed from that first little plot of weeping lovegrass for the first time. He got 28 pounds. He harvested 252 pounds of clean seed from 16 acres of a 30-acre field of weeping lovegrass, although he could not get a combine in time for the best yield, and he had 2 tons of hay after threshing the seed.

Wadley planted his larger field of lovegrass with a drill owned by the Central North Canadian Soil Conservation District. He declared that he could not get along without assistance from the district.

Wadley and his neighbors planted approximately 50 acres in lovegrass last fall, but the best planting time for weeping lovegrass in this area is from April 10 to May 10. In about 6 weeks the lovegrass will be up enough to protect the soil against wind erosion. Until it gets this high the lovegrass itself must be protected against the wind. Shallow listing is one way to do this. When the grass comes up, weeds must be controlled and grazing should be held off until the second year of growth. The small amount of labor involved will be well repaid, for weeping lovegrass, in a coordinated soil conservation program, not only holds the soil against blowing, but provides excellent pasture and hay, conditions the soil with a deep-root system, and serves as a cash crop through the sale of seed.

Wadley was born on the farm which he is now restoring to productivity through a coordinated soil conservation program. His father homesteaded the farm and enlarged it through purchase.

"In the beginning my father used to get 35 bushels of wheat to the acre and 50 bushels of corn," Wadley said. "Wind and some water erosion gradually cut that down. When I became a district cooperator 3 years ago, wheat and corn production was down to 7 or 8 bushels an acre. The farm was scarcely paying its way. Father didn't know what was happening or what to do about it. But I do, thanks to my soil conservation program. I have two boys coming along and I'm going to leave them a farm they can be proud of."



Henry Wadley, conservation leader in his community. He makes effective use of weeping-lovegrass on his farm near Geary, Okla.

Wadley has a diversified farm of 320 acres. Besides his cattle, he has corn, sorghum, cotton, peas, a woodland, pigs, and chickens. The sale of eggs and cream brings in a steady weekly income. The woodland provides fence posts and fuel. Other crops augment the cash income from his basic beef cattle enterprise. His farming methods have won the interest and respect of his community. The Agricultural Improvement Association honored him by electing him president. This association is an organization of Negro farmers living around Endora who are all wrapped up in the new farming ideas which hold so much hope for agriculture in the windy West.

REVIEWS

INDUSTRIAL AND COMMERCIAL GEOGRAPHY. BY J. RUSSELL SMITH AND M. OGDEN PHILLIPS. HENRY HOLT AND COMPANY, NEW YORK, 1946. 957 PP.

This is a book about the materials of industry and commerce. Like "North America" by the same authors, it contains amazing detail put together with outstanding skill. Unusual comments about familiar things keep interest alive. The side remarks add zest to a presentation that might easily have been a mere recital of facts.

The authors remind us that the pivotal point of geography is place. They are concerned about where industrial and commercial activity occurs, where it thrives, where it languishes, and why. Our environment changes, because we deplete some of our resources and learn how to use others in different ways. As the environment changes, the wants, abilities and habits of the people must change too.

About three-fourths of the book is given over to descriptions of the great industries and economic activities. Two chapters discuss the significance of inanimate energy and the fundamentals of manufacture. As long as men and beasts were the main sources of energy, most of the people in the world had to work at food production. Mechanical power eased the problems of survival and made industries possible. Chapters 4 to 22 take up the raw materials of industry—coal and petroleum, metals, nonmetallic minerals, forests, farm products, rubber, fisheries, and the others. The discussion of agricultural products is prefaced by a chapter on the Place and Nature of Agriculture.

These chapters tell the sources, significance and uses of each commodity. Here in the chapters on agriculture, for example, are the dot maps showing where in the United States each crop is grown. Some of the captions under pictures or maps are designed to stimulate curiosity. For example: "In explaining this map of density of cattle and calves per square mile, you have a good chance to test your knowledge of agricultural geography."

Chapters 23 to 36 are about trade. First, "why do we trade," which is because of differences in peoples, differences in the stage of industrial development, and differences in resources. Trade routes and trade centers develop as people seek to exchange the goods that they have for something they want. The trade routes of each continent and of the oceans are discussed. Airways are not neglected. After consideration of technical skill and financial power, the authors conclude that "Airways on and between the Eurasian and North American Continents will carry the bulk of all air traffic in the future." They point out that on the vital routes, the United States does not have airfields and must petition other Nations for landing rights.

The authors have purposely used statistical data from the prewar rather than from the war period. They say, "Politics and wars may change the man-made arrangements like a kaleidoscope, but man must continue to use material resources as best he can. * * *"

The final chapter presents some interpretations of trends in man's affairs. Some resources will be used up. Land will wear out if it is not treated properly. Technology will make better use of power. Increased power may be used for good or for evil. The authors ask, "Is not the real need a careful reappraisal of our spiritual resources and their importance?"

The authors give some significant facts about production of food on rough lands, directly and also indirectly through animal products. Crop-yielding trees such as the pecan, hickory, walnut, persimmon, mulberry, sugar maple, and especially the oaks, may be made to yield many times more food for man or beast than they do now. Selected oak trees in some places will yield more edible carbohydrates per acre than corn on similar land; and acorn bread is palatable. This idea is developed with all the enthusiasm we would expect from the author of "Tree Crops." Possibilities of growing more and better grasses and legumes on our nonplowable pastures do not get quite so much attention. The geography of pastures and range lands is one of the few topics that this reviewer would like to see covered more fully.

Dr. Smith and Dr. Phillips are soil conservationists. They speak with conviction about the impending doom of soil destruction. "The United States Soil Conservation Service has published a terrifying map" (the soil erosion map). They think that this map has significance like that of the handwriting of Belshazzar's wall. So far, thanks to technology, the "fitness of lands to support us is rapidly increasing in spite of the present destruction—often reckless and useless destruction—of resources." They know—and cite crop yields in Belgium as an example—that there are both possibilities and limitations in obtaining better yields through fertilizers and improved farm practices. Pictures in the book show a number of good conservation-farming practices. There are some erosion pictures, too.

The authors have little patience with the system of distribution that lets surpluses accumulate while the land runs down, people go hungry, and the farmer takes the principal production risks. Their comments on this system are stimulating.

The book is remarkably illustrated. There are 50 tables, and hundreds of photographs, charts, and maps. Those of us who remember geography as a dull list of countries, capitals, and principal products in the seventh grade now find that this kind of geography is different. Here are some facts about the things in the world, and an interesting exposition of how the need or the desire for things makes a lot of people behave the way they do.—J. GORDON STEELE.

LOVEGRASS

(*Continued from page* 188)

The solution we may think is a matter of a simple commercial fertilizer. Actually the processes involved in establishing a soil suitable for legumes is an extremely intricate one of creating in the soil harmonious communities of a vast array of bacteriological and animal life. The soil conservation district is in a broad sense an effort to maintain this kind of balance of living forms on the farm, adjusting cows, trees, grass, hens, micro-organisms and men to a harmonious community.

Along with this biological climate of harmonious relationship, there is also in a nation so complex as ours a political climate. In the United States, we use the term "democracy" to describe a balanced and harmonious political structure. It is one political system in which individuals live together, not on one another. Perhaps one of the great contributions of the soil conservation district is the application of democratic principles to land use.

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APRIL 1947

SOIL CONSERVATION

OFFICIAL ORGAN OF THE SOIL CONSERVATION SERVICE

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SOIL CONSERVATION

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WELLINGTON BRINK, EDITOR

CONTENTS

SOIL CONSERVATION is issued monthly by Soil Conservation Service of the United States Department of Agriculture, Washington, D. C. The matter contained herein is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business, with the approval of the Director of the Budget. SOIL CONSERVATION seeks to supply to workers of the Department of Agriculture engaged in soil conservation activities, information of special help to them in the performance of their duties Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., 10 cents a copy, or by subscription at the rate of $1.00 per year, domestic, $1.50 per year foreign. Postage stamps will not be accepted in payment.

Pineapple pattern, Robinson, Oahu.

By V. W. Thalmann

THE LARGEST soil conservation program ever undertaken by private industry is in Hawaii. Pineapple growing is the second largest agricultural industry in the Islands, ranking next to sugar. It was not carried on extensively until after 1900. But by 1939, according to estimates by the Soil Conservation Service, 68 percent of the pineapple lands had lost from one-fourth to three-fourths of the topsoil, and 22 percent erosion had taken away from three-fourths to all of the topsoil. In little more than a quarter of a century erosion had damaged all but about 10 percent of the pineapple lands.

THE pineapple people were gravely concerned. The largest of the companies had tried several methods of field drainage but still, when the torrential "kona" rains came, acres upon acres of the young fields, which had been so laboriously planted and carefully tended, were washed out or covered up with silt. The eroded subsoils that were left were harder to farm, and produced lower yields of poorer quality fruit.

Conditions were especially serious on the Island of Lanai, entirely owned by this company. Approximately 15,000 acres had been planted to pineapples, always in straight rows over hill and down dale. Across the plant rows at 300-foot intervals were the harvesting roads, over 400 miles of them, also in straight lines. No matter where rainwater fell and wanted to run downhill, there was a man-made water course, either a clean-tilled cultivator space between the rows, or a road to help it speed on its way and take the soil with it. After heavy rains the blue ocean waters around the island were stained red with soil for miles out.

The most successful of the earlier attempts to prevent this loss was in 1937 when the Lanai field superintendent experimented with contouring a steep field that was scheduled for planting that

NOTE.—The author is soil conservationist, Hawaiian Pineapple Company, Ltd., Honolulu.

Straight up the slope, and down. The soil left hurriedly and in vast quantities under the battering of a 6.35-inch, 3-day rain.

year. From mainland magazines he had seen how contours had been used in corn and cotton planting, and he decided to set out the rows of plants in contour over the irregular slopes.

Before the plants had time to take root, a torrential rain fell and while it created some damage, the latter was far less than usual, much less than in adjoining fields planted in straight lines.

Pineapples were a new crop to the men who came to form the staff of the Soil Conservation Service at the Honolulu office. But topsoil riding downhill in running water, or over the horizon with the wind, was an old story to them.

The Hawaiian Pineapple Company set aside 60 acres of the 1939 planting on its Oahu plantation as a cooperative experiment. Two other firms, Libby, McNeill & Libby and the California Packing Corporation, contributed other lands. The Soil Conservation Service men were to plan the erosion control measures, and the plantation men were to adopt their methods to the new pattern.

It was decided that contour planting, proved partially successful on Lanai, would not be enough. The miniature dams formed by the rows of plants across the slope were able to hold the rainwater perfectly during moderate rains, but the rains were not always moderate and during the "kona" storms the dams sometimes failed. Terraces—continuous mounds of earth—were built at frequent intervals across the slope, not quite on the exact contour, but with a very slight fall toward one end.

The water which escaped through the contoured rows of plants was to be impounded above the terrace ridges before it could build up to destructive speed, and then allowed to run out along the terraces slowly—so slowly that it could not carry the soil with it. Down the slope, drainage channels were excavated into which the terrace water could be discharged safely. Some sort of protective lining was needed to prevent the sides from being gouged, and the Soil Conservation men from Southern States found an old friend ready at hand to help Bermuda grass. The Hawaiians called it "manienie." Plantation men had worked long and hard to banish it from their fields, and shook their heads at inviting it back—but they planted it, nevertheless. Soon a tough, thick sod guarded the outlets channels against the danger of gullying.

That year it didn't rain very hard. No one was sure whether what they had done was enough, or too much. At any rate, the Hawaiian Pineapple Company decided to put an entire field of 455 acres into a cooperative experiment with the Serv-

Around the hill, for safety's sake. Terracing and contour planting. Same time, same area, as scenes on opposite page.

ice in 1940, while additional fields on the Island of Molokai were contributed by the California Packing Corporation.

After the terraces were completed on the Lanai field and it was half planted, in its most vulnerable condition with soil loosened and pulverized and the young plants not rooted in the ground, the first hard rain came. Nearly seven inches fell in a few hours. Water was everywhere, trickling down the slopes between the terraces, backing up behind the ridges to within a few inches of their tops and flowing slowly along them out of the field. It was clear water, and it was walking, not running.

By that time the Soil Conservation Service men were heavily engaged in making plans for other pineapple companies, for the vegetable growers, and in mapping soils and erosion conditions on all the island, but they agreed to plan around 1,200 acres for the Hawaiian Pineapple Company in 1941. Meanwhile, the management of the company had been doing a little calculating. At any rate, many years would elapse before the thousands of acres on its plantation would be protected. During that time, the valuable pineapple lands might be damaged irreparably by erosion.

When a company proposed that the Service take over the planning for as much as 3,000 or 4,000 acres a year, someone suggested that the company employ a trained man to build up its own soil conservation program.

That was in May 1941. U. S. Allison, who had worked closely with the company, knew a chap in Texas who might be willing to come to the islands. This chap had spent 8 years fighting erosion through the South and Southwest and in Puerto Rico, and he was invited to join the company. That was how the writer of this article happened to go to Hawaii.

In the late fall of that year, prospects were bright for a big year's job of erosion control in the spring of 1942. The survey crews had been built up to the point where they could do the precise, painstaking surveys, and stake out 4,000 or more acres. Tractor and grader operators had learned how to keep the dirt rolling fastest along the blades of their new machines. Answers were being found to the vexatious problem of following the curved rows with the plantation equipment.

Then the Japs struck at Pearl Harbor, and erosion had to be forgotten for a while in the face of a more immediate menace. The plantations went to war, and weeds grew over the fields. By the summer of 1942, the pineapple plants were visible again in the weed-grown fields, and the crop was harvested with half a crew. One advance made that year was in learning how to harvest fruit on roads parallel to the plant rows, so that the roads could curve around the contour, too.

Wrapping up the remaining good land in graceful loops. A contour lay-out on a ridge field. The ridge in the right foreground was formerly in pineapples—now it's beyond bothering with.

That year, 2,700 acres were wrapped around the hills on contour and tied down with terraces.

On January 3, 1943, the rains started on Lanai, and in a few days some 15 inches fell. Nearly 11 inches fell in 1 day on one of the newly terraced fields. Water streamed over the cliffs but it wasn't "soupy—too thick to drink and too thin to plow." There were no washed-out plants, no raw, red scars of gullied land.

During that year the terraces were built broader and with gentler slopes, so that the equipment could ride the ridges better, and the roads were put in the channels above the terrace ridges. Over 3,000 acres were terraced and contour-planted on Lanai, and 2,500 on Oahu.

In 1944 over 6,000 acres were terraced and contour-planted, and the work went on at full blast in 1945. On completion of this year's operations (1946) we will have constructed 1,343 miles of terraces, 25.3 miles of diversion channels, and 74.9 miles of terrace outlet channels on 24,721 acres of pineapple lands.

All of the terraced acreage and a few additional fields, with the exception of limited areas of very gentle slope and some of the field borders for mealybug control, are planted on the approximate

Trimming, slicing, and packing.

contour. With the completion of the 1947 planting, we expect to have nearly all of the 27,500 acres of our pineapple plantations on the contour.

This brief summary of the development of soil conservation in Hawaii, particularly as directed by the one company, barely alludes to the many problems peculiar to this operation. Numerous modifications in accepted mainland terrace design, lay-out, and construction practices have been necessary in order to adapt terracing to our usual

Assembly-line harvesting fits right into the modern scheme of agriculture in Hawaii.

operating methods and equipment. To the tractor drivers and field workers accustomed to seeing the well-ordered plant rows stretching away over the horizon in perfectly straight lines, the first contour-planted field looked like a horrible nightmare.

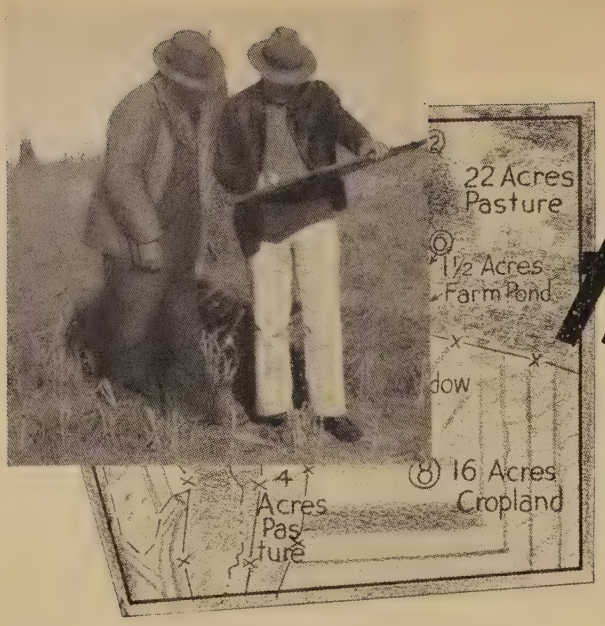
To avoid undue complication of field lay-out, and excessive loss of producing area in roadways, it has been necessary to design terrace spacings, insofar as possible, in multiples of road intervals. Present-day equipment requires roads at a maximum spacing of 115 feet. Although intervals have been far in excess of mainland standards erosion has been slight even in the heaviest rains.

Channel cross-section of the terraces is considerably larger than usual on the mainland, ranging from about 9 to over 20 square feet standard effective section, depending on the slope. This enables us to use rather long runs without excessive grades and velocities. Runs generally are limited to about 1,800 to 2,000 feet in one direction of flow, but occasional runs of 3,000 to 3,600 feet on gentle slopes have operated with apparent satisfaction. A "standard" terrace would be graded 0.2 percent for 800 feet, 0.3 percent for 700 feet and 0.4 percent for 500 feet toward the outlet. On long terraces, 0.1 percent grade sections are included at the upper end, and the lengths of other sections increased if necessary. Additional capacity is obtained by increasing the cross-section along the entire length of the terrace.

To fit the terrace systems into our intensive production operations to best advantage, all plans are worked out on fairly accurate topographic maps prior to field lay-out. Each case is worked out on its own merits both on paper and in the field.

Terrace construction is expensive in comparison with mainland costs. However, it is a very small proportion of total field operating cost. Figures on three representative fields recently completed, totalling 1,253 acres, were $5.15 per acre for survey, lay-out and checking, $3.83 for rock removal, $159.21 per mile for terrace construction, $572.07 per mile or $0.05 per cubic yard

(Continued on page 206)



How a FARM is PLANNED

Looking at plans and specifications: Anis Rivers, farmer; Ted Calvert, technician.

By William R. Elder

LAND in Northeast Texas is generally sandy surfaced, gently to steeply rolling; and originally it was covered with mixed hardwood and pine forests.

Soils are variable, some being deep sands. Some have sandy clay subsoils, others heavy clay subsoils. Except where erosion has exposed the subsoil, surface soils all look much alike. All the soils are of the Forested Coastal Plains. Annual rainfall is about 40 inches, most of which falls in winter months. Erosion has been severe, particularly on slopes over 3 percent, due to continuous cotton growing, few terraces, no winter cover and naturally erosive soils. Slopes are extremely variable, ranging from 0 to 30 percent, with frequent sharp breaks from one extreme to the other.

Farms in this area average about 90 acres, and range from the large livestock farm to the small, intensively cultivated truck farm. A few large cotton farms are left, but due to low yields, erosion and labor shortages, the trend has been away from cotton.

A soil conservationist considers many factors in making recommendations for the safe use of East Texas soils. Some, such as slope and erosion, he determines by observation as he walks over a farm. Others, such as depth, texture, drainage condition and permeability of the soil, are not so readily apparent, and he must get his information from samples and tests. A soil conservation survey of each farm, made by a soil scientist, furnishes the needed information on hidden characteristics.

NOTE.—The author is soil scientist, Soil Conservation Service, Mt. Pleasant, Tex.

THE Anis Rivers farm, located in the eastern part of the Sulphur-Cypress Soil Conservation District, is typical of the smaller, more intensively cultivated truck farms. Rivers moved to the 67-acre farm in 1930 and has been farming it since that time. The land was cleared and put into cultivation in 1904, cotton and corn being the main crops. Erosion has not been too severe on the farm as a whole, due to moderate slopes and to terraces which were put on the cultivated land in 1940. Before the conservation plan was made, Rivers operated this farm with 40 acres in cultivation, 16 acres in pasture and 11 acres in woodland. Faced with declining yields, cropland depletion and inadequate pastures, Rivers attended a meeting with his neighbors in the community church to discuss means of checking erosion and restoring the agricultural prosperity of the community.

At this meeting Soil Conservation Service personnel explained how a soil conservation district provides technical assistance in planning farms, based on the capabilities of the land, the treatment needed by the land, and the needs and desires of the farmer. Having observed the improving crops and pastures, the decreased erosion and the growing prosperity of farms cooperating with the soil conservation district, Rivers made application to the district's board of supervisors for assistance. His application was approved with those of the South Omaha Soil Conservation Group.

A conservation survey having been completed by a soil scientist for each farm in the group, Ted Calvert, a soil conservationist assigned to the district, prepared to help Rivers work out a conserva-

tion plan for his farm. As part of his preparation, Calvert studied the conservation survey, putting in the capability class numerals and determining the approximate acreage in each land use.

By studying the basic inventory of the soil resources of the farm, Calvert was able to evaluate its physical needs and possibilities. He found that Rivers had a choice between continued emphasis on row crops or a change to livestock.

After discussing with the farmer the present cropping system, and the number and kind of livestock, Calvert suggested that they walk over the farm together, taking with them the plain photograph and conservation survey.

"Do you intend to keep about the same acreage in cultivation or would you like to plan on more pasture and more livestock?" Calvert asked.

"I want to keep as much of the cultivated land as I can," replied the other.

This determined the basic plan. Calvert's study of the conservation survey had already indicated that every acre on the farm was adapted to either pasture or meadow, but not all of the land could safely be cultivated.

River outlined his problems as they walked: "My terracing system is not working as it should. Also, part of one of my fields is badly washed and I think it should be taken out of cultivation. The timber is all slow-growing post oak, and I need more pasture. Perhaps some of the woods should be cleared."

Calvert from his previous study of the conservation survey, had concluded that the principal objective of a proper plan on this farm would be to retain approximately the present cultivated acreage, maintain adequate erosion control, maintain or increase soil productivity by use of cover crops and rotations, and develop a pasture and meadow plan which would produce the highest possible amount of forage. The number of livestock kept on the farm could then be adjusted to the feed supply.

Starting in Field 3, a 6-acre cultivated field which is partly Class II and partly Class III land, the two men discussed the terraces, and agreed upon the conservation crop rotation, including the cover and soil improving crops. Referring to the conservation survey, Calvert found the soils well adapted to growing the crops Rivers wanted. A crop adaption table, based on the pooled experience of all Soil Conservation Service personnel and farmers in the area and showing crops, legumes and grasses adapted to each soil, was used. This table is of considerable value to Calvert in his planning work, particularly in cases such as this, where truck crops are grown. Soil characteristics have an important influence on truck crops where heavy fertilization is necessary.

The farmer and the technician walked on to the farm pond. This pond had been constructed for some time, was adequate in size and had a good spillway. It was not seeping, since it was constructed on a soil having a dense clay subsoil. They discussed the possibilities of the pond for both stock water and fish production, and planned the stocking rates and management practices.

Moving on, they came to a cultivated field (No. 7), and Rivers said: "Here is one of those spots where I haven't been able to hold the soil, and I don't grow much here. Maybe I need to do something else with this." This area was one of the critical spots found by Calvert in his study of the conservation survey. His tentative treatment before seeing the farm was either to put it in sericea lespedeza meadow, as the soil was well adapted to that crop, or to put it in pines. Since Rivers realized its limitations as cultivated land, and the conservation survey showed it to be in Capability Class IV, Calvert said: "I believe you could grow some fine sericea lespedeza here for your cows, control erosion and improve your soil all at the same time." Mr. Rivers nodded his agreement. A 2-acre meadow was planned which will yield 2 tons per acre of a hay equal in quality to alfalfa, yet grown on soil incapable of producing alfalfa.

Passing to the next field, partly woodland and partly pasture, the owner explained: "I have thought of clearing this timber off and making pasture out of it, but it will supply enough posts to do the fencing I have to do, so I haven't been in a hurry." Glancing at the conservation survey, Calvert found the woods to be growing on two kinds of soil: Class II land and Class V land, both well suited for pasture development. Replying to Rivers the technician suggested: "I believe you could clear all of the timber off of this area except the trees that will make posts—those you can cut later as you need them; that way you can go ahead and overseed with clovers and lespedeza and develop your pasture now." (This cleared area together with the adjoining land already in pasture now provides 22 acres of high quality pasture, and supplies the bulk of the grazing for the livestock kept on the place.)

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The two men returned to the cultivated land in Field 8, where the terraces which were not functioning properly were inspected and marked for a complete engineering check-up later. The rotation was worked out and checked against the crop adaptation chart for the suitability of the soil for the crops chosen.

Proceeding to Field 9, a 4-acre timbered slope of Class VI land, Calvert recognized another critical spot, which he had already marked for treatment. Since this timber was slow growing, small post oak not suitable even for posts, the use being made of this area was not economical. "This isn't worth much as it is," Calvert observed. "It's too steep for cultivation, but the soil is still fertile and fairly deep. Planted in kudzu, you could hold and improve the fertility of the soil on this slope and at the same time have a fine temporary pasture and meadow crop that would help out a lot with the grazing during the heat of the summer when your other pastures are poorest." After some discussion as to the number of crowns needed, method of planting and care of the stand, Rivers decided to clear the worthless timber and plant 4 acres of kudzu.

As they crossed a neck of Field 2, a small bottomland already in pasture, the farmer and Calvert discussed the overseeding of white dutch clover, since this area is particularly suited to it from both a soil and moisture standpoint. It was agreed that the overseeding would be done.

Moving into Field 5 as shown on the map, Rivers said: "Now this land used to make good crops, but washed too much before I got it terraced, so now I don't make anything to speak of here." This was the third critical area observed by Calvert in his preliminary study.

"You could build this up and either cultivate it again or make pasture out of it, but it would be a long, slow process," Calvert explained. "The quickest way to get this in production again would be to put it in sericea lespedeza. With phosphate and proper seeding you can tie the land down and make a good hay crop at the same time." Moving around the slope, they came to a seepy spot which was not cultivated. Nodding at it, Rivers remarked: "That spot is good after it dries out but I never can plant it at the time I plant the rest of my crops, as it is too wet then."

Calvert pointed out: "You could plant kobe lespedeza and tie it in with the sericea meadow so that both could be cut at the same time."

There remained only Field 4, a 10-acre cultivated field. As they crossed it, they discussed rotations, cover and soil-improving crops, and particularly the adaptation of the crops to the soil. The terraces and outlets came in for consideration and were marked for further checking.

From the notes Calvert made, which he later used in writing up the plan, he found that Rivers had 32 acres of cultivated land which he could safely leave in cultivation. Eight acres he had been cultivating would go into pasture and meadow. Of the original 11 acres of poor timber, 7 would go to pasture and 4 to kudzu. All post trees were to be saved until needed. On the 26 acres of pasture and 7 acres of meadow Rivers could carry 8 head of cattle safely without buying feed.

A sound conservation farming plan resulted from all this: (1) erosion had been controlled; (2) adequate conservation crop rotations had been set up, with enough cover and soil-improving crops; (3) pastures and meadows had been planned to provide the maximum feed supply; (4) proper land use had been attained in all fields; and (5) the plan fitted the operator's needs, desires and equipment.

This plan was developed quickly, accurately and with a minimum of discussion primarily because of two things: First, the operator is a progressive open-minded farmer eager to improve his farm, second, the technician, because of his study of the basic inventory of the soil resources, knew the farm's c a p a b i l i t i e s. Together, they arrived quickly at a sound plan with every crop and practice on land suited to its production and protection. As a result, Rivers looks forward to a constantly improving farm, with better crops and better livestock, secure in the knowledge that his farm is here to stay.

DISTRICT NAMED FOR PERSON

Massachusetts has the first soil conservation district in the Northeast—perhaps in the Nation—to be named after a person. The Richard T. Fisher Soil Conservation District is the new designation for what was formerly the Northwestern Worcester County District. The board of supervisors chose the new name in honor of the professor who attained world-wide fame as director of the Harvard Forest, which is in Worcester County and which became a unique forestry institution under his guidance.

In the farmland around Utica, N. Y., radio station WIBX is making a consistent effort to encourage better soil practices.

To help other radio stations which may be interested in doing something similar, here is a partial report:

Regular, systematic contact is made with the soil conservation district offices in the WIBX coverage area. Each morning, quite early, before the technicians have gone out into the field, Tom Page, WIBX farm director, contacts them, and talks over the things they are doing.

This occupies some little time for him and for the various SCS men. However, WIBX and the soil conservation districts in the Mohawk Valley of Upstate New York have found that the time is well-invested.

One of the big problems faced by SCS districts has been that of getting to larger numbers of farmers, with a clearer picture of what the work is really all about.

By clarifying his own information in direct talks with the field men, Page is better able to pass the word along.

Because WIBX serves a dominantly dairy region, several programs have been built around pasture improvement.

Pasture improvement is usually done with a bulldozer, which clears thornbrush and often old hedgerows. Swampy places are drained. The land is levelled if that is necessary, although it is usually not a major problem. Then, to kill roots of trees and brush which may survive the clearing with the bulldozer, the land is plowed and cropped for a year.

It is then fertilized, fall plowed, manured during the winter; it is top-dressed with lime if the pH is too low or with superphosphate if it is too high.

Seeding is done with an approved mixture, determined for the region after on-the-job experiments by the State College of Agriculture.

Naturally, the soil conservation effort takes in other phases of work. This one has been chosen as an example.

WIBX has assigned a quarter hour each Thursday morning to soil conservation work exclusively. Other broadcasts throughout the week, (WIBX carries a minimum of 13 farm service broadcasts each week), may also give considerable time to notes of importance.

Reports from technicians in the field are compiled, with brief explanatory notes, and are broadcast. In this way, farmers hear of the activities of their neighbors. It is felt that farm people may be given ideas in this way which they might not get so soon without the broadcast. Farms are cited for their experience with farm ponds, drainage and diversion ditches, contour and strip cropping, cover cropping, and many other practices.

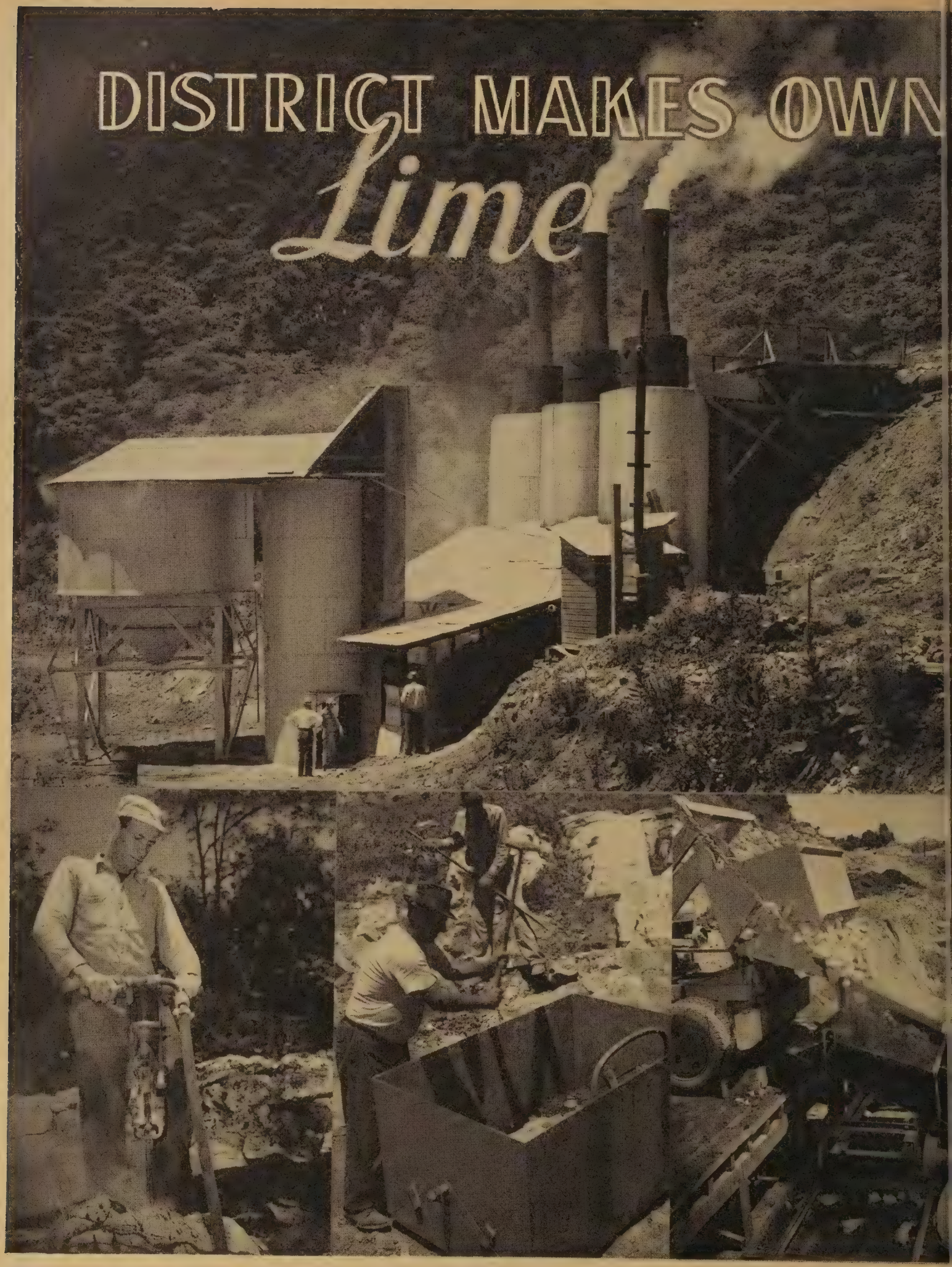
From time to time, soil conservation people appear on the broadcasts. In most instances they appear without scripts, but with informative notes. The discussion has an easy, informal quality.

The WIBX special-events truck and an engineer are sent with Page into the field.

Recently, for example, they drove into the country several miles from the highway, where the Oneida County Soil Conservation Service was using dynamite to construct a ditch through swampland on the Albert Maier farm, R. F. D. 1, Clinton, N. Y. For most of an hour, Tom Page, in working clothes, and up to his boot-tops in icy water, assisted and asked questions. Technicians Lynn Abbott, F. E. Mulvaney, and Stanley Greene, and Maier and his son Albert, Jr., were at work. When the 250-pound charge of dynamite was planted, they went up to a spot near the WIBX special-events truck. A 750-watt, 60-cycle, 110-volt generator in the truck, provided electricity to operate the GE wire recorder.

The entire project was described for the broadcast. Everyone made his contribution. Finally, the "hot-stick" was placed. That is, the end stick of dynamite with the electric cap in it was connected. At a signal from Page, Abbott, a licensed

(Continued on page 215)


DISTRICT MAKES OWN
Lime

Pictures and text

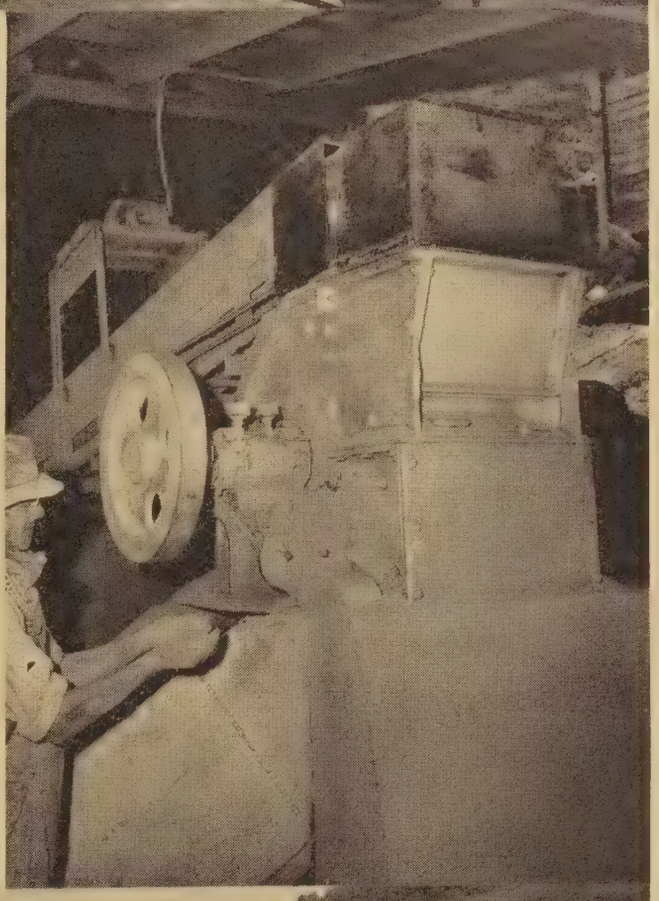
By Hermann Postlethwaite

DISTRICT supervisors of the West Fork Soil Conservation District, Clarksburg, W. Va., are mighty proud of their w lime plant on historic Rich Mountain, in Randolph unty.

Modern in every way, this plant was built at a cost of 0,000 by the State Soil Conservation Commission, which ed part of the revolving fund of $100,000 appropriated by e legislature for development of agriculture within the ate. It has been turned over to the district supervisors for eration.

The three tall brick-lined steel kilns are capable of pro- cing 50 tons of ground burned lime a day. At $8 a ton r bulk lime and $10 a ton for sacked, this is about $4 less an the prevailing local prices. When full production is ached, it is hoped the price can be cut to $5 a ton for bulk ne.

(*Continued on next page*)



NOTE.—Mr. Postlethwaite is photo editor, Soil Conservation Service, Wash- ton, D. C. He was formerly conservation aide, Clarksburg, W. Va.

Dairy herd of Otis Lawther on pasture improved by Rich Mountain lime; 18 acres support 18 animal units. Pasture has been clipped for weed control.

Strip cropping on farm of F. D. Bartlett, Lost Creek, W. Va. Every acre of farm, cultivated and pasture, has been limed—and shows it.

Efficiency is the keynote. A compressed air-drill takes the place of the old back-breaking, hammer-pounded hand-drill, and dynamite loosens great quantities of the native limestone with the twist of a wrist at the battery box.

Four to six inches of fine coal is put into the dump buckets. The latter are picked up by a truck and moved over to the face of the quarry, where they are filled by hand with knapped stone. This is the only hand operation from native stone to agricultural lime.

The hydraulic hoist, mounted on a low truck chassis, lifts the full bucket and maneuvers it into position over the hopper. This hopper is mounted on rail tracks and can be moved into position for filling the kiln. The dumping mechanism releases the bottom from the bucket, letting the mixture of stone and coal flow into the kiln.

The burning operation goes on continuously. Coal and new stone keeps feeding the fire and the burned stone is drawn from the bottom onto conveyor belts which carry it to the crusher.

Instead of hauling stone to the fields and waiting weeks for nature to do the slacking, the crusher does it in a few minutes. The powder-fine lime is deposited in two storage bins by bucket elevator and conveyor belt. One bin is for bulk delivery and the other for packaging, together they have a capacity of over 250 tons.

All conveyor belts and the crusher are electrically operated from current supplied by a rural electric line.

At present farmers must come and get the lime. Eventually, the supervisors expect to own trucks with spreaders attached. They will then haul the lime and, for a small additional fee, spread it on the land for the purchaser.

Soil Conservation Service technicians estimate that more than a million tons of lime will be needed as an initial application on the 7,400 farms in the 4-county district. Thereafter, 50,000 tons should be applied each year for continued maximum production. The sale of lime is not restricted to one district. After district cooperators are supplied, anyone within the State may buy from them.

The Rich Mountain plant is but the first of several which the State Soil Conservation Commission plans to build in West Virginia.

The West Fork Soil Conservation District supervisors—A. E. Rogers, Bernard Linger, G. Manley Curry, Paul Nutter, and Ross Leatherman—estimate that there are several million tons of stone available in the deposit they have leased.

PINEAPPLES ON THE CONTOUR

(Continued from page 199)

for outlet-channel excavation, $415.25 per mile for outlet grassing, and a total of $22.61 per acre for the completed job.

Cost of our completed terracing program, including revisions to be made on some of the earlier jobs to bring them up to present standards, is estimated at about $500,000. Flood control work in the Palawai Basin, Lanai, including settling and detention reservoirs, channels and disposal sumps, will cost an additional $100,000.

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LAND USE and Conservation

By Chester C. Davis

President, Federal Reserve Bank of St. Louis, Mo.

IT HAS been estimated roughly that man has existed for only about a quarter of 1 percent of the age of the planet earth. The last few years—perhaps 10,000—since man began to plant seeds and harvest the crops, probably amount to only one-fifth of 1 percent of the age of man. Yet in that short time comparatively great civilizations have grown, flowered, and have perished because man destroyed the soil in which they were rooted; desert sands now blow over the marble ruins of once great cities.

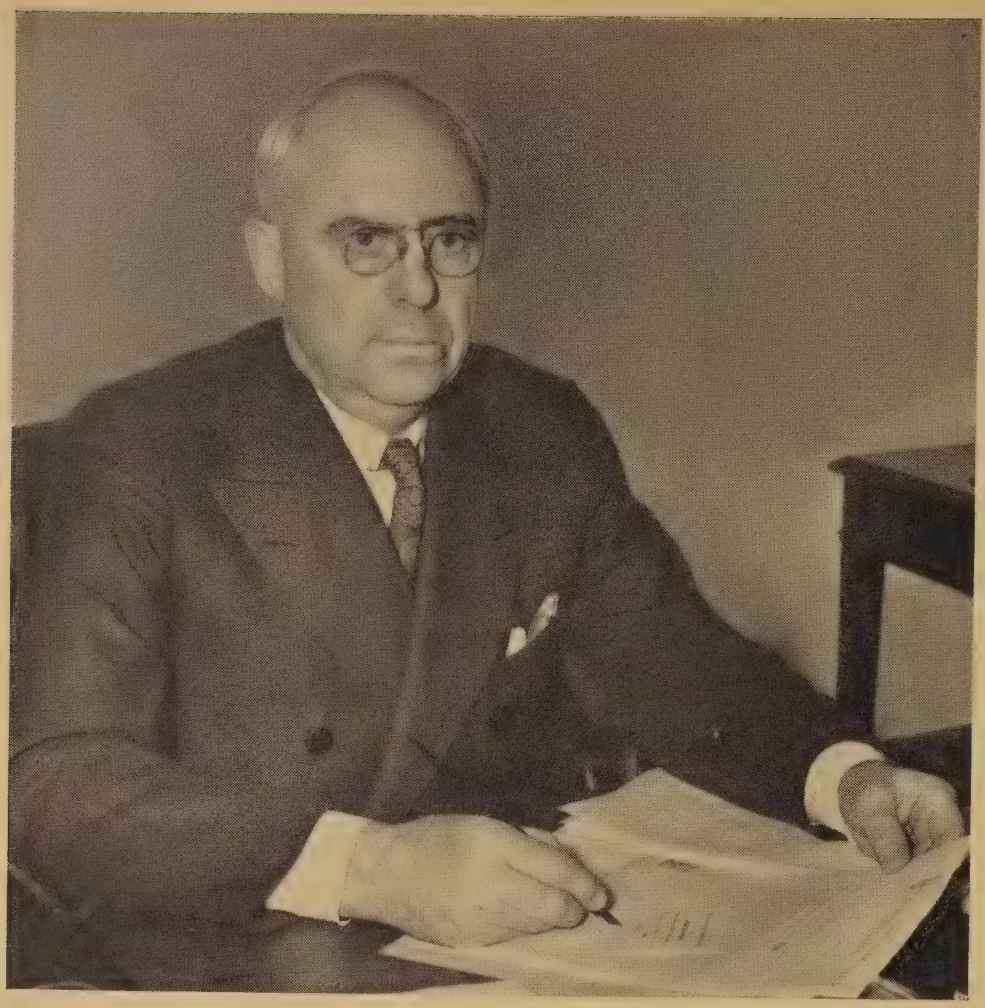
It was only a little over 300 years ago that white man's plow first pierced the soil of America—a span which compares with the earth's antiquity as the tick of a clock with eternity. Yet the loss of the land, the waste and impoverishment of our soil in that span of years has been incalcuable, and is still going on. Estimates of the Soil Conservation Service, frequently quoted, say that since colonization began in what is now the United States, at least 50 million acres of once good land have been ruined by soil erosion; it has been abandoned and can no longer be farmed. Another 50 million acres are swiftly coming to the stage where it is unfit for farming. One hundred million acres of once good land gone! On another one hundred million acres, more than half the topsoil is gone and on a third one hundred million acres, erosion processes are actively under way. These are not new figures but they tell the story of improper land use, of the failure of the American people to care for the land. They sound a warning; they highlight the importance of proper soil management and land use on every farm in the United States.

LET me sketch in just another bit of background the moral or ethical aspect of soil conservation and improvement. If this nation is to hold the basis for its future greatness, each generation must preserve and enhance the soil resources for the use of generations to come. Up to now each generation has defaulted in this responsibility. The English Government is now proposing that a farmer's right to hold and operate a piece of land be made conditional; that if he fails to operate the land as decreed by the State the land may be taken from him. We recoil from that suggestion here. We prefer to tackle the problem through education, demonstration, leadership, and financial inducements or subsidies. But make no mistake about it, that problem stares us in the face and we haven't licked it yet in spite of some progress made. The day is gone, if it ever existed, when the fact that an individual holds a deed to a piece of land gives him the moral right to destroy it through stupid, short-sighted farming practices.

For a century, successive wars have hastened the process of waste and destruction of our land and our natural resources in spite of our feeble efforts at organized conservation. Our conservation balance sheet continues to show more losses than gains, notwithstanding the progress made in recent years in enlightenment, in acreage organized in soil conservation districts, in the application of approved practices, and in the return of life-giving minerals and organic matter to the soil.

Look at what we are doing compared with what needs to be done. The Agricultural Adjustment

NOTE.—This article is taken from a somewhat more extended address delivered at the Graduate School Seminar, Department of Agriculture, Washington, D. C., on January 16, 1947.



Chester C. Davis, statesman of finance.

Agency's 1945 report presented an estimate of actual conservation needs. . . .

According to this estimate, the farms of the United States need currently to have applied to them 60 million tons of ground limestone and 13,200,000 tons of 20 percent superphosphate annually. What has the record been? 23,830,000 tons of limestone and 1,950,000 tons of superphosphate spread by participating farmers in 1944; 21,338,000 tons of lime and 2,400,000 tons of superphosphate spread in 1945. This marks a tremendous gain in recent years, but it is still far short of what is required for the economic and the physical health of the nation. . . .

THERE is no use of going into general figures as to need and performance in the case of other conservation practices. . . . No matter what we have done, our performance has been small in comparison with what we need to do. And I am about finished with generalizations, with total national estimates and reports, and ready to get down to cases in the balance sheet of conservation farming or balanced farming or whatever you want to call it.

First let me say that *when we organize conservation districts, or hold meetings or publish bulletins we are only helping build the frame for the conservation picture. The painting in of the picture itself is done by actual, concrete performance on the individual farm.* I want to drive home this point: *the pay-off comes in the adoption for an individual farm of a complete, integrated, balanced program of soil and water and crop and livestock management. The program to be fully successful must be complete.*[1] The mechanical engineering steps of terracing, contour cultivation and grassed waterways are not enough. Minerals need to be restored, soil health brought back with organic matter, with crop and livestock systems fitted to the land. It may take 5 years, or 8 to 10 to complete such a program on a farm, but the starting point must be a plan that sets our definite steps to be taken each year. When the plan is set, then it is up to the operator to stay with the job until it is done.

Proper land use on the individual farm is simply a matter of fitting the cropping system to the natural capabilities of the soil.[2] Then, after determining the crops best adapted to the land, working out an erosion control and soil-building pro-

gram which will give maximum output at minimum cost while maintaining or increasing the productivity of the soil.

Not until that kind of performance is under way on every farm in the country can we rest assured that this Nation has met its over-all responsibility for the care of the land. Furthermore—and it has taken a long time for me to build up to the point where I talk like a banker—every dollar of new capital that goes into carrying out such a soundly conceived farm plan will repay the investor or lender in short order through increased yields and lower production costs. The farmer or land owner or mortgage lender will have a better farm 5 to 10 or 20 years from now than he has today to operate or to secure his loan, an assurance altogether lacking in American agriculture as a whole right up to now.

Let me throw a few figures at you with which many of you are familiar. The Soil Conservation Service completed a survey early in 1946 covering nearly 10,000 farms in all parts of the United States—farms on which comprehensive programs of soil, crop, and water management had been adopted. These farms showed an average increase in the per acre yield of major crops amounting to 36 percent over the average yields obtained before the programs were undertaken.

I could give you from the records thousands of illustrations ranging from single cases to sizable surveys like the foregoing, to show that farmers who do the best job of maintaining their soils make the best incomes. It will save time if you will accept that as true, and will permit me to get on with the story of some things we have been doing out in the Eighth Federal Reserve district which will, I hope, bring the problem down to dimension where we can grasp it.

Realizing that bankers have great direct and indirect power to promote the adoption of sound land use plans on the farms of their communities, the Federal Reserve Bank of St. Louis started out a little over a year ago to take the story out to them. In cooperation with the land grant college and the State bankers' association in each State, we have held a series of 27 dinner meetings in western Kentucky, northern Mississippi, Arkansas, west Tennessee, and southern Illinois, to which we invited the bankers, asking them in turn to bring along leading farmers, many of whom were directors of the banks. We also invited the Soil Conservation Service technicians and district supervisors, the county agents, vocational agricultural teachers, and P. M. A. committeemen. The Soil Conservation Service supported the program in every way.

We had about 3,000 guests at these dinners, and the interest and attention were nearly perfect. About 4 out of 5 of the banks of the areas visited were represented, which we thought was good, considering that in many cases men had to drive 50, even 100 miles, from their homes to the towns where the meetings were held. The meetings all followed the same pattern. A representative of the agricultural college, using colored slides with pictures taken in the neighborhood, showed the right way and the wrong way to handle the land, and showed clearly how well good practices had paid off right in that county or in adjacent communities where conditions were similar. The agricultural economist of our bank then followed, and presented the records of a single farm case selected as typical of that area—a farm where such a plan as I have been talking about had been adopted and carried out, and where before-and-after records were available. His charts showed from the records the year-by-year investment as the program was carried out, and the actual increase in yields per acre and per farm in crops and in pasture carrying capacity year by year as the improvements took effect. He then outlined a plan by which such a long-range improvement program could be financed by a bank or other lending agency, with amortization repayment based on applying to the loan only a part—usually 50 to 60

[1] The italics are the Editor's.

[2] All soil and water conservationists, will, in the opinion of the Editor, be pleased with banker Davis' definition of soil and water conservation. This definition conforms with the basic guiding principle adopted in the beginning by the Soil Conservation Service and held to at all times, both as a guiding principle and as a hard and fast operational policy. Note the definition by the Chief of the Service (in our American Land, Miscellaneous Publication No. 596, U. S. Department of Agriculture, Soil Conservation Service):

"Soil conservation is proper use and care of the land. It means using the land to produce the greatest amounts of the things most needed, and at the same time protecting it so it will not lose its productiveness. The conservation measures used are being constantly improved by careful research at soil conservation experiment stations throughout the country. All land is not alike. Each field or acre must be used for things it is best suited to produce, and protected according to its needs.

"All measures that help keep the land productive are tools of conservation. Terrace, contouring, organic matter, grass, crop rotations, fertilizer, legumes, shrubs, trees, drainage if the land is too wet, and irrigation if it is too dry—all of these are conservation tools. It is conservation whether the practices are used separately or together."

percent—of the value of the increased yield that could reasonably be expected to result from the improved practices.

We were very conservative in the formula we used to convert those increased yields into dollars. Leaning way over backwards, we used the 15-year average Missouri farm prices of 1925–39, which figured 75 cents for corn, 96 cents for wheat, 40 cents for oats, $12.50 for alfalfa, 11 cents for cotton, and $1.50 a month per animal unit for pasture. In the illustrations we presented we did not count conservation payments in as income available to help repay the investment or retire the loan. If we had, the repayment schedule would, of course, have been greatly shortened.

Before and after these two main speakers, I emphasized the existence of an enormous money supply in bank deposits and currency which might be used destructively in bidding up land and equipment prices unduly, or constructively in carrying out complete programs of soil and water management, and in equipment, electrification, homes, and farm buildings which would increase the efficiency and comfort of farming. I put it up to the bankers that it was in part their responsibility to guide the flow of investment into productive channels. Generally, in the towns we visited the bankers and businessmen were keen to get factories, industrial pay rolls, established there. I reminded them that if those farms in their communities that badly need to stop erosion and to rebuild the soil and its fertility would start this very year on complete conservation programs, the added wealth produced would far surpass in dollars and cents any pay roll they could reasonably hope to acquire.

There was a lot more to it than that, but what I have told you gives you the idea. Now I want tc go back and look at some of those farms we used as illustrations.

First, we studied individual farms which had completed soundly planned land use and farm improvement programs and on which good records are available, in an effort to determine what it costs to convert a farm in a given area from an exploitive system of farming to a balanced plan of operation. We found out what the differences were in cash returns from a balanced land use program as against the old wasteful system, and identified the amount of income that could be traced directly to expenditures for soil conservation and soil improvement practices. It has been intensely interesting. . . .

I think the most significant fact in our research to date is that in all analyses of individual farms we have completed we have not found a single instance in which the investments made for soil conservation, soil building, and other farm improvement practices were not highly profitable. I can best illustrate these variations by giving you some dollars and cents figures on the individual farms.

On a 267-acre farm in northwest Missouri, for example, a 10-year program of converting to a sound and balanced land use program cost a total of $9,714. The problem on this particular farm was primarily one of erosion control. The mineral content of the soil is reasonably high but the topography is rolling and the soil erodes badly. While some minerals are needed for maximum crop output, most of the costs of the farm improvement program here went into erosion control practices, such as terraces, grass waterways, concrete outlet structures, and new fences to line up the fields with the lay of the land. Over the 10-year period, the return from the investment was $15,655 at the average prices I referred to. This was enough to liquidate the full cost of the program and leave the farmer an additional 50 percent for his efforts. Based on the same average prices, the annual income from the farm was increased by $1,944 and the maintenance cost of the program, above the ordinary operating costs, runs approximately $300 per year. On this farm it cost $36.38 per acre over the 10-year period to complete the program and out of that amount $33.25 per acre represented permanent improvement to the land.

Contrast this Missouri farm with a 584-acre farm located in the brown loam hill area in Northwest Mississippi on which a complete improvement program was carried out in a 6-year period at a cost of $7,834 and with added returns of $12,527 for those 6 years than can be traced directly to the improvement investment. The cost averaged $13.41 per acre, over half of which went into lime and mineral fertilizer. Permanent improvement to the land was $6.37 per acre.

The general topography of these 2 areas is somewhat similar. The erosion process, however, has gone much further in the Mississippi area and a large proportion of the 584-acre farm was so badly damaged that it was fenced off to go back into timber production. In that area nature is kind and will almost single-handedly take care of re-

forestation if given a chance. Little cost was involved on that score. The improvement expenditures then were primarily on the lower hillsides where pasture was developed and in the valleys where some row cropping can be practiced. On the Missouri farm, on the other hand, the entire farm with the exception of a wooded pasture is capable of row crop production if a proper soil management program is developed to protect the soil from the ravages of erosion.

Another farm located in the Black Belt that extends into central Mississippi offers an additional contrast from the viewpoint of costs and returns from farm improvement. In a 10-year program on a 145-acre farm in the Black Belt, a total of $8,832 is required to install a sound land use and balanced system of farming. This averages a total cash outlay of $60.91 per acre, a high percentage of which goes into the mineral program. Out of the $60.91 per acre, only $17.12 represents permanent improvement to the land. Despite this unusually high investment, however, in the 10-year period $12,430 in new income could be traced to the $8,832 investment. Calculated on the same average price basis, the income from the farm was increased by $1,711 with an annual maintenance cost of $600.

To carry this analysis a little further, let us review some figures from 10 farms scattered throughout the Eighth Federal Reserve district on which we have analyzed the records of farm improvement programs on a before-after and through-the-middle basis. These 10 farms include a total of 2,255 acres of land with an average normal appraised value of $47.64 per acre at the time the improvement programs were started. The time involved in the improvement programs has ranged from 6 to 10 years and for the 10 farms has averaged 8 years. The average improvement cost per acre has been $29.28 which is approximately 61½ percent of the original normal appraised value. However, the average per acre returns during the period in which improvement programs were being completed increased $65.47 which is a $2.20 return for every $1 invested in soil improvement. Of the total of $29.28 invested per acre, $17.58 represented permanent improvement to the land and raised the normal appraised value on the average from $47.64 to $65.22 per acre.

The average farm of those analyzed would be a 225½-acre farm with a normal appraised value of $10,744 at the time the improvement program was started. An addition of new capital in the amount of $6,603 would be required to complete the improvement program in an 8-year period. This investment of new capital would result in increased income in the 8-year period of $14,568, or $2.20 return for each $1 invested. The yearly income from the farm following the completion of the improvement program would be increased by $2,391 with an annual maintenance cost of $568 which would leave a net increase in income of $1,823 per year. The normal value of the farm would have increased to $14,708.

That, I think, pretty well gives the story for the individual farm, and while I have long been convinced of the moral responsibility we have towards sound land use, these studies and a pile of other evidence prove to me that, morals or ethics aside, from a cold business standpoint, the man who controls a farm cannot afford *not* to start now on a complete and integrated program of conservation farming.

One more word about capital. A conservation program, generally adopted, would require a lot of it. There was a time when the lack of capital would have been definitely a limiting factor. In isolated instances that may even be true today. It has been interesting to me, however, to project the cost of a complete improvement program on every acre of land in a given community and then lay the figure of total costs alongside bank deposit totals for the same community. In most agricultural areas the local supply of capital is more than sufficient to meet the cost of farm improvements if they were to start now and proceed much more rapidly than we can ever hope will be the case. You will find in almost every instance that bank deposits, and in many cases even the amount of uninvested cash on hand in banks, will exceed the amount of new capital that would be required to complete a sound land use program on every acre of farmed land in the community.

Now it is true, of course, that while the total supply of capital within a community may be sufficient, there will be individual instances where the farmer lacks sufficient liquid reserves to meet the need in his particular case. He may have to resort to borrowing to carry out a sound soil improvement

program. I am convinced that a well-planned soil improvement program carried out under the right kind of supervision is a sufficiently profitable venture to justify the ready extension of credit for its completion. Farm improvement plans can be developed and financed on a basis that will enable the farmer to repay the borrowed money from income earned directly by the improvement investments. It requires a little different type of loan than the conventional real estate loan or the crop production loan with which we have long been familiar. Lending money for farm improvement programs requires a careful analysis of the individual farm and a flexible extension of credit wherein money can be advanced in varying amounts on farm real estate mortgage security over a period of years. The repayment program needs to be geared to the income pattern of the farm, varied in amount repaid from year to year as income from the improvement investments develops.

This ordinarily will mean a farm mortgage loan on which several disbursements will be made each year for a number of years and on which repayments may be very small during the early year or two of the program but will increase as the income from the farm improvement investments develops. The outstanding balance of the loan may actually increase during the first few years of the improvement program. In the farms we have studied, we have yet to find a case where money could not have been advanced to meet the costs of the conservation program as they arose, and be repaid entirely by the increased income from the improvements with plenty of margin to spare. Soil improvements, given only a little time, pay their own way, and more, without dipping into the income that would have been produced on the farm without the soil building program. I know of no other type farm mortgage credit that is so obviously self-liquidating as a loan for soil improvement.

Multiply the single farm by hundreds for the community, tens of thousands for the State, and millions for the Nation, and what do we get? Vastly increased returns, reduced costs of production, and larger profits even at the lower price levels we shall one day see. In the aggregate, a land that is at long last adjusting itself to eternal fruitfulness.

Every man must look out on the world from where he stands, so I have told you this little story about the Eighth District, though it is not different from many that others may tell. The Federal Reserve Bank of Cleveland held soil meetings of this sort in Ohio before we did. The American Bankers Association has adopted under the direction of its president C. W. Bailey of Tennessee, a great conservationist as well as a great country banker, an aggressive conservation and land use program. In my part of the country the State bankers associations of Illinois, Missouri, and Kentucky have made conservation farming their country bank program this year. Other business groups are aware of the issues and are ready to help. And in a Nation where less than a fifth of the population actually lives and works on the farms, intelligent and informed support by non-farm groups is essential if we are to develop and keep a constructive agricultural policy.

During the period of World War II, we have seen miracles of production by American agriculture. Food and fiber grown on our farms sustained our armed forces and that of our Allies and helped keep civilian lives going in friendly lands aboard. With only 15 percent of the Nation's labor force in their ranks, the farmers of the United States brought food production 30 percent above the prewar level and held it there. The food production on the farms of the United States last year averted mass starvation that threatened many millions of the earth's population.

During the early years of this vast increase in farm output, I think many observers regarded it simply as a phenomenon of war, the result of long hours and hard work on the part of farm people to produce more to meet the war emergency. I think, however, that Sherman Johnson's recent publication "Changes in Farming in War and Peace" tells the real story behind the increasing output of American agriculture; that the increase has resulted primarily from bringing into focus during the war emergency the technical "know how" of farming that had been developed but not fully utilized during the interwar years. There has been much speculation about where the postwar level of farm production will ultimately settle. Many have felt that after the war had ended, it would settle back to normal with a total output from American farms somewhere around the prewar level. I think, however, that as more new farm machinery becomes available, as more commercial fertilizer and lime are produced and made available to farmers, as more and improved erosion control practices are applied, and as more of the technical "know how" is taken out to the farms through the channels of the Extension Service, the Soil Conservation Service, the Producton Marketing Administration, and some of the other educational agences in the field of agriculture, we may look forward to a continued high level of production above the prewar levels.

This all means that the years ahead will see some tremendous shifts and developments in American agriculture. Systems of farming will be more closely geared to sound land use capabilities. Increased amounts of mineral fertilizer and lime will be used. Many miles of terraces, drainage ditches, and other water control devices will be constructed. Fences will be reset to match the lay of the land. Much new farm machinery will be

purchased and many acres of abandoned land in some areas will be brought back into production of good pasture, small grain crops, and timber. Great number of new farm buildings will be constructed and many others completely renovated. All these developments will require capital and in the aggregate, they spell the need for a tremendous volume of new capital on American farms.

We are dealing here with a subject as broad and as deep as human life itself. It is impossible for me even to touch on all its facets in one compressed treatment. Scarcely a word has been said on the highly important subject of timber. In my part of the country men no longer say reforestation and tree cropping is not a field for private investment. Individuals and corporations are demonstrating that high yield and safety both can be found in intelligently managed pine and hard wood timber lands. Nothing has been said about the fundamental importance of this program of land and water management to wildlife, fish and game. And up to now, I've talked a lot with scarcely a look at what needs to be done, and how to go about it, to get the individual farm operator on the farms that need it, to plan now, and then to carry out next year and the next and the next, complete and balance soil improvement plans.

We have made a great deal of progress. The rate is not fast enough. On balance, we are still losing ground. I believe the American public is soil conservation conscious; that business, civic, and financial interests and organizations will support an intelligent program to get conservation plans made and performance started on farms where it is most needed. I think we all see that the goal is worth while. I wish I had a blueprint to leave with you that would chart the way to its attainment.

Leadership, it seems to me, will have to come from agriculture—the Department, the State Colleges, and the farm and cooperative organizations. I wish we might have closer teamwork there. * * *

I have tried to bring out in this talk the importance of a carefully worked out conservation plan for the individual farm, with a definite time schedule to follow. While there are plenty of cases where this has been done, I have the impression that it is not receiving the attention it warrants. The agricultural conservation payments should be used as a powerful leverage to bring about concerted farm planning. Perhaps that is the way they have been administered, but I do not get that impression in the field, where you see a farm pond here, a strip of terracing there, a grassed waterway somewhere else, but not tied together as far as eye can see in an orderly, integrated whole.

We need to develop, and soon, a well-considered, open-and-above-board policy for the orderly development and the economical use of our great mineral fertilizer resources. If they are applied in an orderly, balanced program, we should be putting on the land infinitely larger quantities of lime, phosphate, potash, and of the lesser known minerals of which smaller quantities are needed, but which are tremendously important to plant, animal, and human health. I am inclined to believe that the Department of Agriculture has the responsibility for leadership in developing such a program. * * *

I think, too, that we are on the threshold of important discoveries bearing on the relationship between soil health and human health and happiness. * * * There is no time to develop this here, but again, the Department of Agriculture, with its enormous equipment for research, and its great power to direct research, has a primary responsibility.

Some of my old friends are likely to arise and remind me that I have been talking of policies that will increase the production of our farm plant at a time when we must look soberly toward a falling off of wartime demands for many products of the farm. I am not forgetting nor minimizing the great and difficult adjustments agriculture will need to make when the war-born vacuums have been filled. The foreign demand which we have tried to meet, will not continue very long. Restoration of war-damaged farms has A–1 priority. Abroad, too, farm imports will be sought from countries which will accept payment in the form of manufactured goods. We can look forward to the time when we will not need billion bushel wheat crops for human food, and when our cotton crop will have to find its level along with synthetic fibers and foreign growths. On the other hand, milk, meat and other dairy and livestock products, tobacco, poultry, fresh vegetables and fruit will have a sustained and expanding market here at home if employment and wages and non-agricultural production keep high. . . .

Recently I have spent a great deal of time driving over Missouri, Southern Illinois, Western Kentucky, Tennessee, and other parts of the Eighth Federal Reserve District. I saw the enormous waste and destruction caused by row-cropping the hills and slopes. Hundreds of thousands of hills and slopes in this country ought to be in permanent pasture or legume and small grain rotation instead of growing sorry crops of cotton and corn. * * *

I could talk to you all night about the amazing opportunities all around us to build safer and more profitable farms on the ruins of the old ones simply by using the land right. Soil conservation and the kind of farming that goes with it are not only right morally—they pay big dividends in dollars and cents. We can use a lot of the capital and the labor we have in every community to put complete soil-and-water-use programs in effect on individual farms. We have the capital, the tools, the "know how," the minerals, and the seeds and plants with which to work a farming revolution here. The only thing that stands in the way is human inertia—human behavior again.

Now in conclusion: Along with some of you, I've gone the full cycle from the last war to this watching the evolution of farm policy aimed to provide remedies for farm problems as they unfolded. I am not afraid of the new or the untried, or of government action. But I know there is no magic. There is no substitute for efficient production, which can be secured by the intelligent use of plenty of capital per man in the form of land, tools, buildings, lime and fertilizers, and livestock. Nothing can take the place of good management of our soil and water resources.

It will be better to seek high returns per worker through large-volume, low-cost production, than to try to get the same high return by means of high prices for scarce, limited production. But the rest of the economy must play the game under the same set of rules. * * *

Benefits From Farm Woodland Management

By John W. Keller

FARM woodland management is a new phase of the American farm business, in comparison with management of cultivated fields, pastures, meadows, and livestock. Many of our farmers are only now learning that it is an important part of the farm economy. Many of them have let their woodlands deteriorate. They haven't carried out conservation practices, and their woodlands have produced less each year.

Farm woodlands that are carefully and intelligently managed are bringing in returns to the farmer frequently as high as those from cultivated fields, pastures, meadows, and orchards. The "farm forestry forty" managed by the Southern Forest Experiment Station at Crossett, Ark., is similar to many farm woodlands of second-growth loblolly and shortleaf pine. Each year, products that should be harvested are removed, on all parts of this forty. In 1945, after 7 years of planned management, the forty returned a dividend of $15.09 per acre. On experimental areas of the Alabama Agricultural Experiment Station at Auburn, Ala., planted southern pines have yielded wood products of the following value per acre per year: Slash pine 12 years old, $14; slash pine 17 years ago, $12; loblolly pine 20 years old, $20. These returns compare favorably with those from growing beef cattle. Gross returns from beef cattle production in Alabama in 1943–45 ranged from $10.50 to $20 per acre per year. One large land owner in southern Georgia stated recently that the profits from his wooded area more than made up for losses on his cultivated lands. In Region III (Indiana, Iowa, Michigan, Minnesota, and Ohio), net returns per acre per year from farm woodlands under management for 6 years or less averaged $8.50 for one group of 25 woodlands and $1.92 for another group of 39. (Ref.: Stanley S. Locke in the Journal of Forestry, Vol. 43, No. 10, "Income from Farm Woodlands.")

It is the business of Soil Conservation Service farm planners to plan proper land use for the entire farm. They must show the farmer how to get the highest returns from all parts of his farm, including the woodland. It is not always easy to convince a farmer of the actual value of farm woodlands. In advising farmers who have never been interested in their woodlands and have made no attempt to manage them conservatively, the planner needs facts and arguments supported by figures, if possible from farmer experience in the locality that will prove the value of woodlands in the farm economy.

If the farm planner makes a real effort, he will find about as many arguments to prove the importance of farm woodlands as there are to prove the importance of cultivated fields, pastures, or meadows. The principal arguments include these facts about farm woodlands:

(1) *They furnish wood for use on the farm.*—The average farm in the United States requires about 1,000 board feet of lumber, 150 fence posts, and 10 cords of fuel wood annually. At average current prices, these products are worth over $200, which the farmer would have to pay if he bought them. But the farmer doesn't buy these wood products. He cuts them in the farm woodland with farm labor, in the winter, when farm labor is not busy with other farm jobs. The woodland saves the farmer $200 annually.

(2) *They furnish revenue for farm operating expenses.*—When cutting wood for use on the farm, it is not hard to cut a few extra trees that are mature or should be removed to let more productive trees grow. This surplus of wood products usually finds ready sale locally. A little extra work in the farm woodland will not only improve the woodland but also net a few hundred dollars to increase the farm receipts.

(3) *They furnish employment for labor during the winter.*—Year-round farm labor should be gainfully employed during the winter when many of the planting, tending, and harvesting jobs for the usual farm employees are over. Farm woodland work during the winter completes the seasonal labor chart, filling in until the spring activities of the farm begin. Woods work pays a higher rate per hour than many other types of farm work, where a normal growing stock of trees is present.

(4) *They furnish various other benefits.*—Farm woodlands furnish protection, food, and nesting places for insectivorous birds and other wildlife. They afford recreation for the farm family. They retain needed soil moisture. Also, they temper the hot drying winds of summer and the strong, cold blasts of winter.

NOTE.—The author is Assistant Chief, Forestry Division, Soil Conservation Service, Washington, D. C.

REVIEWS

ELEMENTS OF SOIL CONSERVATION. By Hugh Hammond Bennett, McGraw-Hill Book Company, Inc., 1947. Pp. 406, figs. 114, graphs 14, Price $3.20

Centered on the cover of this book is a small but very impressive design of a modest moldboard plow. This innocent-looking implement, together with the axe, "stripped nature's protective cover from the ground . . . and laid bare great areas of rich soil to the forces of erosion. . . . The damage was not done maliciously but simply without thought of the consequences." The primary purpose of the author is to point up these "consequences" and to suggest the means by which erosion forces can be stopped in their tracks.

The scope of the book is lucidly presented in the chapter titles: the erosion problem in the United States, extent of erosion, effects of erosion, how erosion takes place, rates of erosion and run-off, climate and erosion, rainfall peneration, national program of soil conservation, planning for conservation of soil and water, use of vegetation in soil and water conservation, contouring, terracing, channels and outlets, gully control, control of erosion on stream banks, water spreading, wildlife and soil conservation, small dams for water storage, stubble-mulch farming, farm drainage, farm irrigation, and the place of trees and shrubs in soil and water conservation.

Bennett is an evangelist. In his enthusiasm for the cause he is inclined toward the use of highly impressive figures of the type that cannot be verified. He states that 50 million acres of cropland has already been ruined by erosion and that, for all types of land, this figure can be set at 282 million acres. He estimates the annual monetary cost of erosion to farmers at 400 million dollars and to the nation as a whole at 844 million dollars. He sets a value of 3 billion dollars on the annual loss of plant food constituents, depletion of fish in streams, and damage to the oyster industry. He says that "more than 3 billion tons of solid material are washed out of the fields and pastures of America every year, enough to load a freight train that would encircle the earth 18 times at the equator."

But when one examines the more dependable experimental data that are presented and studies the many very revealing photographs of actual damage from erosion he wonders whether Bennett's figures are not too modest an estimate of the price we have been paying. Certainly it is much more logical to say that soil is an "irreplaceable resource" and that "once it leaves a field it is as irretrievably lost as if consumed by fire" than to say that "the soil is the one indestructible, immutable asset that the nation possesses," as did Milton Whitney, Bennett's boss, 40 years ago.

In contrast to the 968-page "Soil Conservation" by the same author, which every loyal soil conservationist promised himself to read but somehow never did, this is a very readable book. It begins by telling the alarming tale about the evils of soil erosion. Then it takes the tack that "there is no longer any question as to whether or not the nation can cope with them," and outlines the proven means of keeping soil in place and water under control. The first step is planned use for the eight classes of land that are differentiated. The starting point in soil and water control is set down as some type of vegetation and this becomes a permanent cover of grassland or forest as the problem becomes more difficult of solution. Time is found to consider the place of wildlife in such a program.

The level of presentation is that of the high school, but the book will form the basis for the first course in conservation in many agricultural colleges. Each chapter begins with an enumeration of the topics to be considered and ends with a set of questions. A list of visual aids for each chapter is appended at the end of the book. The illustrations are uniformly excellent and could never have been collected except for the highly effective aid of the field forces of the Soil Conservation Service. Where photographs fail to meet the need, well-prepared graphs take their place. The book is destined for a very wide reading, not only by high-school and college students but by the public at large, and deservedly so.

FIRMAN E. BEAR.

PINEAPPLES ON THE CONTOUR

(Continued from page 206)

Our business is pineapples, and we expect to continue in it for a long time to come. To that end, we are committed to the policy of bequeathing to our successors a heritage of unimpaired soil resources. We believe that some worth-while progress has been made to date, but the greater challenge lies ahead.

VOICE OF MOHAWK VALLEY

(Continued from page 203)

blaster, checked for all clear, and plunged down the handle. The ensuing blast rumbled among the hillsides, and was caught on the wire recorder.

Then followed a description of the newly opened ditch. It was pointed out that the opening of that ditch, 7 feet wide at the top, 2 feet wide at the bottom, and nearly 5 feet deep, was accomplished for nearly a half mile in 1 day by two men—at a cost to the farmer, of only 12 to 15 cents per foot. The wire-recording was broadcast on a regular Thursday morning SCS period.

Problems vary with the country. Individual radio farm directors must work out their own methods. But effective assistance to soil conservation districts by smaller radio stations is definitely possible, and from the standpoint of all concerned it holds great promise.

REFERENCES COMPILED BY WILLIAM L. ROBEY

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SECRETARY OF AGRICULTURE

HUGH H. BENNETT
CHIEF, SOIL CONSERVATION SERVICE

ISSUED BY SOIL CONSERVATION SERVICE, U. S. DEPARTMENT OF AGRICULTURE
WASHINGTON, D. C.

In this Issue—

WELLINGTON BRINK
Editor
Art Work by
W. HOWARD MARTIN

SOIL CONSERVATION is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business, with approval of the Director of the Budget. SOIL CONSERVATION supplies information for workers of the Department of Agriculture and others engaged in soil conservation.

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FOOD FOR THOUGHT.—The annual banquet of the Jaspar County (Iowa) Soil Conservation District came up with a unique idea or two which may commend themselves to other occasions of the kind. The menu leaflet was decorated appropriately by the design reproduced—with slight modifications—herewith. And the bill o' fare itself was of more than ordinary interest:

Ham.—From a hog grown on rotation pasture and a balanced ration.

Candied sweet potatoes.—Fortified with minerals derived from good soil management.

Peas.—Grown on the contour.

Mixed green salad.—High in essential vitamins and minerals; grown with commercial fertilizers on good topsoil.

Rolls.—From wheat grown in strip cropped fields.

Ice cream and wafers.—From a contented cow fed on improved brome-alfalfa pasture.

Coffee.—The product they have an awful lot of in Brazil.[1]

[1] Where they also have a lot of erosion, but where SCS has trained several Brazilian technicians to do something about it. (Footnote added by H. H. Bennett.)

THE COVER.—Leading off this issue is A. F. Hallowell's photograph of Donna Hoke and her dog Lassie. Donna is a prime exponent of the fact that happy people come of happy land.

Donna is 6 years old and in the first grade at school. She is the youngest of seven children, the other D's being Dorothy, Druscilla, Delia, Dietta, Dennis and Dale.

Donna's father, William G. Hoke, operates two farms in York County, Pa. He was one of the first men in his community to request a soil conservation program. Last year he wrote the supervisors of the York Soil Conservation District: "Before 1937, when I first instituted soil conservation practices, I was troubled continually with gullies, fertility washing on the road and highway, which at one time caused a serious accident. The sloping portion of my farm, under cultiva-

(Continued on page 225)

Flood Control on the LITTLE SIOUX

By GEORGE C. LAMP

On the Little Sioux watershed in northwestern Iowa two Federal agencies are coordinating their work to solve a problem of recurrent flooding. Downstream, the Corps of Engineers plans to enlarge and stabilize major channels and build a system of dikes. This will increase the river's carrying capacity.

Upstream, the Soil Conservation Service has completed surveys and launched a 15-year program designed to retard runoff from the land and reduce sedimentation. Its measures include land-use changes, waterflow retardation, erosion prevention, and channel improvement works.

The Little Sioux program, is the first flood control activity launched by the Department of Agriculture in the Missouri River Basin. It, therefore, is of national importance.

Works of improvement for the watershed were authorized by Congress in Public Law 534, December 22, 1944. The approved program authorized Federal funds of $4,280,000 for development of detailed work plans for tributaries and subwatersheds and for other operations. Approximately $2,500,000 will be used for major gully control.

An additional $1,627,000 in labor, equipment and materials will be supplied by farmers, by State, and by local sources.

The Little Sioux watershed covers approximately 4,500 square miles of northwestern Iowa and southwestern Minnesota, 93 percent of it being in Iowa.

The river rises in Nobles and Jackson Counties, Minn. From there, the main stem flows southwest to south, emptying into the Missouri River at a point about halfway between Sioux City and Omaha.

Glacial soils are found in the northern tip of the watershed but deep loessial deposits predominate in two-thirds of the area. These soils are highly erodible. Inasmuch as slopes in the southern part of the basin range from 8 percent to 50 percent, large areas of land suffer severe erosion. An extensive network of gullies of great depth is advancing rapidly into upland farms.

The trench-type gullies which have cut down through the loessial soil to depths of 60 and 70 feet are the major problem of concern.

Run off and sediment from the loessial areas have caused damage amounting to more than $500,000 annually. In three of the last 5 years, the cost has run to more than a million dollars annually.

The first preparatory step was taken January 3, 1946, when the Iowa State Soil Conservation Committee called a public hearing at Sioux City. It was attended by land owners, members of the State Committee, representatives of all the Soil Conservation Districts in the watershed, the Extension Service, the Farm Bureau, and the Soil Conservation Service.

Many aspects of the Little Sioux problem were discussed that day. Reports from the surveys indicated that farmers would benefit by $2.06 to $2.52 per acre, for each dollar invested, and that the public would profit by $1.14 to $1.82 per acre on each dollar invested.

Note.—The author is George C. Lamp, assistant State conservationist, Soil Conservation Service, Ames, Iowa.

In 1936 Congress enacted the Omnibus Flood Control Bill which gave the Department of Agriculture authority to make investigations of watersheds for "run-off and waterflow retardation and soil erosion prevention in the interest of flood control."

The Department subsequently placed these activities in the hands of the Soil Conservation Service and the Forest Service.

Chairman Earl Elijah appointed a temporary committee which has since become a permanent Works Committee. Each of the 9 soil conservation districts is represented.

The Works Committee requested special assistance from the Iowa Extension Service on a general educational program, and the latter assigned a full-time man to this job. It asked the State Soil Conservation Committee to help in developing contract and agreement forms. Such forms have been perfected and are now in use on the watershed.

The Committee enunciated the following principles:

1. All flood control assistance shall be made available to cooperating parties under a uniform and well-defined procedure.

2. Priorities for assistance will be based on the percentage of land owners within a subwatershed who participate, on the quality of flood control conservation farm plans developed in the area, and on the percentage of plans actually applied to the land.

3. Soil conservation districts will be responsible for making flood control assistance available to individual farmers and other local interests.

4. Each subwatershed will be treated as a unit although it may comprise several smaller watersheds. The effects of such subwatershed treatment will be considered in developing plans for treatment further downstream.

5. Districts will not consider requests for assistance until 70 percent of the land owners in a subwatershed have expressed willingness to participate in waterflow retardation and soil erosion prevention on their farms.

6. The districts will use 15-year agreements in cooperating with private land owners and other local interests.

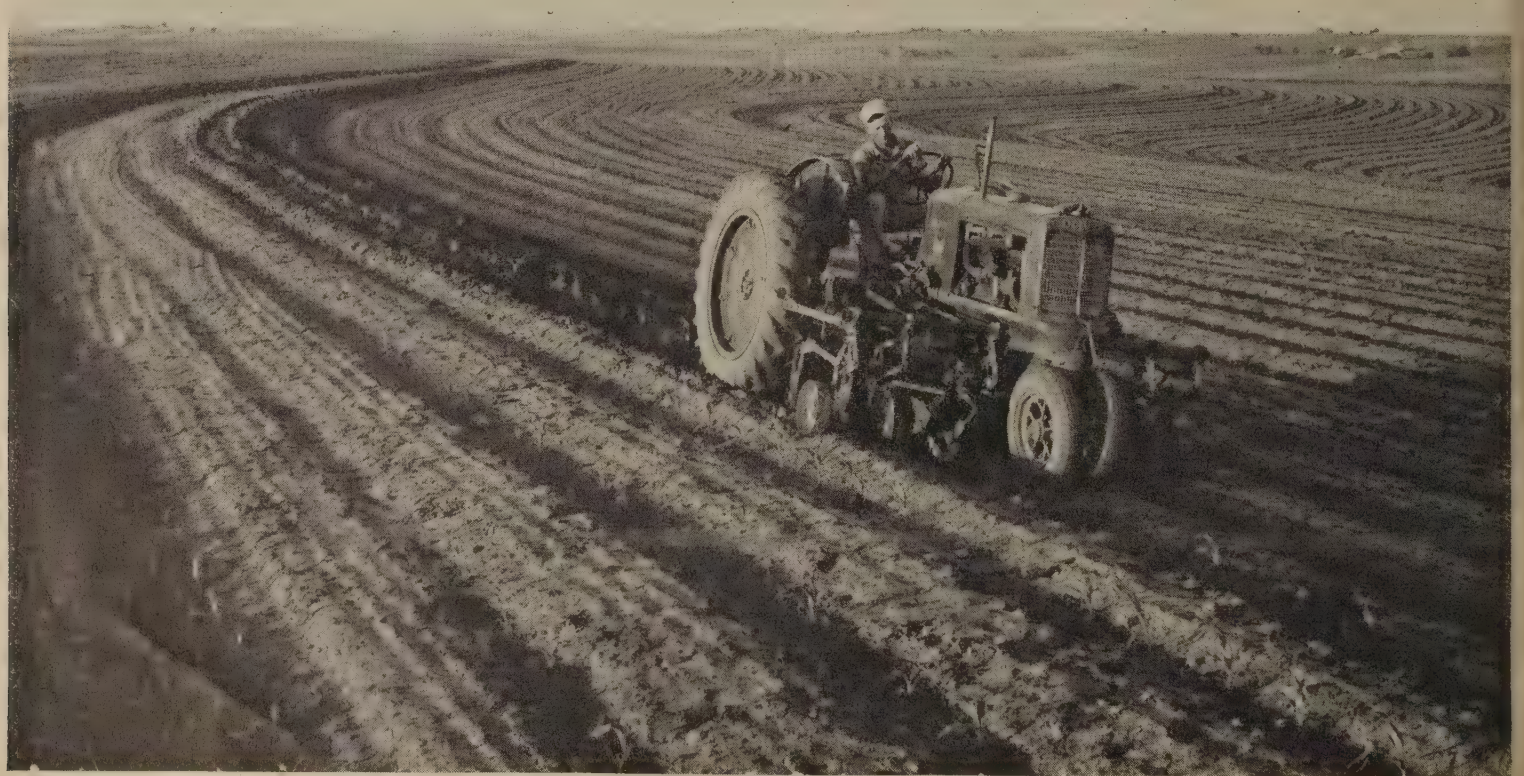
7. The districts will have responsibility to see that the educational needs are provided to the degree necessary to expedite the work.

Soil Conservation Service assistance made available from flood control funds will be used in planning and installing measures as provided in work plans.

Land owners will contribute cash to a district maintenance fund for 15 years, in accordance with policies developed by the district. The district will administer this fund in maintaining structural works installed for the stabilization of water-disposal systems.

The district supervisors and representatives of the Service will make periodic inspection jointly of the major gully control structures to assure successful operation and consistent maintenance.

Land owners will be directly responsible for maintaining all other land treatment on their properties.



Terrace systems and contouring are part of most flood-control conservation farm plans.

Stream-channel meanders, caused by flood flows, destroy farm lands and develop hazardous situations along railroad and highway rights-of-way.

Railroads and highway departments will provide rights-of-way for flood control installations, pay one-half the cost of installing earth fills, and will be responsible for maintaining the works of improvement located on their properties. All flood control works on such lands will be constructed under the supervision and inspection of the Service, and in conformity with designs developed by the Service.

The districts will be responsible for obtaining easements and rights-of-way for all flood control works they operate and maintain.

Technicians of the Service are responsible to Carl Fritzsche, district conservationist, at Sioux City. Farm planning activities have been speeded by assigning two new farm planners and aides to the Woodbury County Soil Conservation District and one to the Soldier-Maple Valley District. With the assistance of the district governing bodies, the district conservationists determine when the flood control technicians and other assistance may be made available for initiating operations in selected subwatersheds.

The technical group prepares work plans for flood control operations. It also prepares detailed plans for and supervises application of the flood control measures.

By the end of 1946 work plans had been developed for 13 subwatersheds, and detail plans were in progress on 3 of these. At that time farmers had organized 60 subwatershed groups. In 1 work group alone, 259 flood control conservation farm plans had been developed during the year.

Of interest is the progress made by the 28 land owners in one 3,400 acre subwatershed. By January 1, 1946, only 18 had requested and secured district assistance in developing farm conservation plans which embodied provisions for complete water management.

Before the end of the year, however, news of the Little Sioux Watershed program got to them and 9 of the remaining 10 farmers requested district assistance in developing flood control conservation farm plans. The group formed an

organization, appointed a chairman and a committee to look after its interests.

Many district governing bodies have made progress toward developing understandings with local interests with regard to works of improvement needed for flood control. One district has reviewed the work plan for a 400-acre subwatershed with the land owners and the county board of supervisors. Two control structures in the road right-of-way and four on farm lands are required for stabilization of the water-disposal system.

Approximately 17.5 miles of terraces are planned and partially constructed; 25 miles of grass waterways have been planned and 75 percent established; 65 acres have been converted from cropland to pasture and all cropland is farmed on the contour and in rotations recommended in the district work plan. It is estimated that peak flows in this subwatershed will be reduced approximately 60 percent and sediment loads will be reduced as much as 80 percent. This is the first subwatershed to be treated with flood control assistance. Work on structures was to begin shortly after April 1, of this year. These land owners will contribute approximately $1,500 to the district maintenance fund before the construction contracts are let; they will also make annual contributions of about $250 for 15 years. In addition, they will pay for a small percentage of the annual repair costs for structures installed on the farm land in their subwatershed.

All the district commissioners have noted an increase in application of farm land treatments since the flood control program was first announced.

Complete flood control treatment in a few subwatersheds is the immediate job ahead. This will enable the people to see for themselves what can be accomplished through cooperative work.

The soil conservation districts regard subwatershed group organization of land owners as an important step in arousing a sustained interest in soil conservation and in doing a better job of correcting land and water problems. Such an approach, it is felt, will result also in better maintenance.

WHY SOIL CONSERVATION DISTRICTS ARE POPULAR AND SUCCESSFUL IN KENTUCKY

1. *They give service.* They meet the needs of farmers by providing them with expert assistance in protecting and improving their lands, acre by acre.
2. *They are democratic.* They are created, directed and managed by locally selected farm leaders who contribute their time and effort.
3. *They are independent.* They are legal, self-governing subdivisions of government through which local, State, and Federal programs of conservation are being coordinated and carried out.
4. *They stimulate community action.* They are flourishing organizations, participating in a Nation-wide conservation program. Community and watershed problems, such as wasteful despoliation of land and streams, forest and wildlife resources, beyond the reach of individuals, are being solved.
5. *They pay.* They promote increased incomes of cooperating farmers through increased yields, and contribute to improvement of the general health and welfare.

A. Threlkeld,
President, Kentucky Association Soil Conservation District Supervisors.

McARTHUR IS THE "MAN."—The growing importance of soil conservation districts in agriculture has been highlighted by the selection by *Progressive Farmer* of E. C. McArthur of Gaffney, S. C., as the "Man of the Year" in South Carolina agriculture. (See "District Profile" in Soil Conservation for July 1945.)

McArthur's soil-saving began on his own 165-acre farm and in his own Broad River Soil Conservation District, which he serves as a supervisor. What he did on his own land and in helping his neighbors brought him recognition first as president of the South Carolina Association of District Supervisors, next as president of the Savannah River Soil Conservation Districts Association, and, in 1946, as first president of the National Association of Soil Conservation District Governing Bodies.

Because of the soil conservation treatment of his own land, McArthur now grows 60 bales of cotton on half the land formerly required to make that yield, and other crop yields have jumped in proportion. As a result of the increased feed grown through better land use and rotations, he has added a registered herd of Herefords. Half of his farm income now is derived from livestock.

"At his own expense (because he received no salary either as district supervisor or as president of the state association of supervisors) McArthur has traveled over the South and to national meetings preaching soil conservation with all the fervor of an old-time evangelist," Progressive Farmer's editors said.

Teamwork in TEACHING

By GEORGE S. ROUND

EDUCATIONAL responsibilities of the Extension Service in connection with the development of soil conservation do not cease with the formation of the soil conservation district, says D. E. Hutchinson, Extension soil conservationist, University of Nebraska College of Agriculture. If anything, the responsibilities for maintaining an educational program increase with the acceptance of soil conservation by the local landowners.

The Nebraska educational program calls for the Extension Service to work closely with local supervisors and technicians working with soil

Above we take a look at the workings of the Nemaha County Soil Conservation District, Auburn, Nebr. The educational and informational program for 1947 is being planned right along with the work plan and the development of priorities for field work. Starting at the left, are Lloyd Nichols, supervisor (1946 World Herald contest winner); Homer Matthews, supervisor; Elmer Berg, supervisor, secretary; L. E. Smedley, district conservationist; Fred Allen, supervisor, chairman (standing); C. B. Patrick, work unit conservationist; John Steele, county agent; E. C. Demarest, supervisor.

conservation districts. The Soil Conservation Service recognizes the Extension Service as the agency responsible for dissemination of agricultural information in the State. The Extension Service recognizes the technical responsibilities of the Soil Conservation Service.

These two agencies work as a team. The Soil Conservation Service supplies information relative to soil and water conservation, and the Agricultural Extension Service presents this information to the public through accepted educational and informational media, including newspaper releases, feature stories and radio programs.

The responsibility for the actual organization of soil conservation districts rests with the local people. But the Extension Service undertakes to inform farm people of the need for soil and water conservation. It has the responsibility also of telling landowners how they may help solve the problems of erosion through organization.

The Extension Service assumes responsibility for education both before and after the soil conservation district is formed. Prior to the organization of a soil conservation district, an educational program to inform local people of the benefits conservation will bring to the county is best carried out by having local people set up a county-farmer committee to head up the work. Such committees have functioned successfully in Nebraska.

Getting a complete program of soil and water conservation on the land is a job that falls into two general classes of activity. One is the application of practices which require on-site assistance of technically-trained soil conservationists; the other is that part of soil conservation work which can be accomplished by educational means. The latter job includes paving the way for technical assistance, maintaining practices established by on-site assistance, and creating a desire by the operator for improving his already-established conservation program.

Educational phases of the annual work plan requested of each soil conservation district board of supervisors by the State Soil Conservation Committee are considered of great importance. The State Conservation Committee suggests that the annual work plan be made jointly by district supervisors, the county agricultural agent, and Soil Conservation Service technicians.

NOTE.—The author is Extension Editor, University of Nebraska.

Method demonstrations in which farmers and ranchers are shown how to do many of the soil conservation jobs are a joint soil conservation activity carried on by the Extension Service and the Soil Conservation Service in Nebraska. Usually they are carried on prior to on-site technical assistance furnished by the Soil Conservation Service to individual district cooperators.

The Nebraska Extension Service looks with pride on the leadership its agricultural agents have accepted in assuming the responsibility for assisting in planning these demonstrations and carrying out the publicity in connection with them, and for their guidance to district supervisors or cooperating farmers appointed by them to look after the details and arrangements for the demonstrations of methods. All this prepares the way for Soil Conservation Service technicians to supervise the demonstration of practices and discuss the techniques involved.

At a large demonstration, Extension and Soil Conservation Service technicians are usually present to discuss soils and crops problems. At the smaller meetings the county agricultural agent handles this educational phase.

Method demonstrations have been highly effective in Nebraska. Held right out on the land, with machines and equipment actually in operation, they have a natural attraction for the farmer. Where the crowd is large, a public address system is essential. The county soil conservation district chairman or the county agricultural agent usually is master of ceremonies.

Another joint educational activity is the planning and conduct of tours of soil conservation projects. Here, again, the agricultural agents work closely with soil conservation district supervisors and Soil Conservation Service technicians. The tours usually are to nearby counties where there is work already established. Stops are made at farms showing a complete soil and water conservation program.

Hutchinson declares that there is no substitute for seeing. The success of tours emhpasizes that truth. Tours give farmers an opportunity to see work that is already established and effective.

Although both demonstrations and tours play a big part in the cooperative education, many districts go even further and hold annual conservation meetings for summing up achievements of the past and emphasizing plans for the future. The county extension agent, soil conservation

district supervisors, and Soil Conservation Service technicians work together to prepare an interesting day's program. District supervisors report on the year's accomplishments. Usually specialists from the College of Agriculture are present to discuss phases of agronomy or soils. Some counties hold all-day meetings, others afternoon meetings, still others evening meetings.

The Nebraska soil conservation educational program does not stop with the farmer. Future farmers of the State are reached through the schools. The Nebraska State Department of Education is wholeheartedly behind the teaching of soil and water conservation. The biggest problem is to find school teachers who are suitably trained. A number of county agricultural agents and Soil Conservation Service district conservationists have worked with county superintendents to train rural school teachers in soil conservation. In one Nebraska county, the chairman of the district board of supervisors requested the county superintendent of schools to contact the county agricultural agent and work out a program of conservation education for the county schools. The county agricultural agent called in the district soil conservationist and the Extension Soil Conservationist, and together they worked out a conservation education program which has been successful for that county.

To help soil conservation technicians keep informed of new developments in crops and soils work, and to keep field recommendations consistent, the agronomy department of the College of Agriculture twice annually sponsors a special short training school for technicians assigned to soil conservation districts.

The cooperation between the Soil Conservation Service and Extension Service in Nebraska extends well beyond immediate educational activities. Soil Conservation Service technicians helped the Extension agronomist last fall in determining the corn yields for the Nebraska corn yield contest. The information gathered will be of value to both the Soil Conservation program and the Extension agronomy program.

The Omaha World-Herald "Soil Conservation Recognition Program" is another activity with which the Soil Conservation Service and Extension Service cooperate. It is one of the Nation's outstanding agricultural-recognition projects.

The extension Service and Soil Conservation Service cooperate closely in getting out special soil conservation editions of the World-Herald and of State and county newspapers. Local county agricultural agents and Soil Conservation Service technicians work together in supplying various kinds of news stories on soil conservation to the press.

Where local community conservation meetings are held, the Soil Conservation Service and county agent work side by side to provide the program. The county agent is responsible for publicity and invitations. The Soil Conservation Service technicians assist with the technical discussions of soil and water conservation.

The Extension Service and Soil Conservation Service in Nebraska, with the approval of the State Soil Conservation Committee, worked together to develop a "Guide to Conservation Farming," for two physiographic areas of Nebraska. They have also worked together to develop a circular called "Grass Down Field Waterways." Now they are in the process of developing a number of similar publications, the printing being done by the Extension Service.

The Soil Conservation Service also works closely with the Extension Service in developing soil conservation phases of the Nebraska Farm Unit Planning program. In Nebraska the program is carried on only in areas where farmers are cooperating with soil conservation districts. The soil and moisture conservation plan for the Farm Unit Plan is an important part of farm unit planning, and is the one worked out by Soil Conservation Service technicians with district cooperator.

Hutchinson maintains that the educational phases of soil conservation merit the best thinking and assistance of which the Extension Service is capable. Increased emphasis on soil conservation calls for the Extension Service to do its part in the educational phases. The close cooperation with the districts of the Nebraska Extension Service and the Soil Conservation Service will continue to benefit immeasurably the Nebraska farmer who practices soil conservation.

(*Continued from page 218*)

tion, which was stripped on the contour in 1937, is earning $6 per acre more than before it was stripped. On the steepest portion of the farm we planted various species of pine trees in contour furrows as a water break and soil retainer, which answers the purpose very well. In simple words, I consider soil conservation an asset to my farm."

By July 1947, there will be at least a billion acres of land in organized soil conservation districts.

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100,000 Fight Soil Losses

By G. L. NOBLE

A NEW and potent partner in controlling erosion on farms is the National 4-H Soil Conservation Activity, which was added to the noteworthy list of club projects in 1944. Forty-three States and Puerto Rico accepted the activity and more than 100,000 4-H members throughout the Nation received soil conservation training last year. Present indications are that the participants in 1947 will outnumber those of last year.

The training included, among many other soil conservation activities, contour farming, strip cropping or terracing, making soil tests for limestone, phosphate or potash requirements; establishing permanent pastures, removing wooded lots from grazing, sodding waterways, planting shelter belts and windbreaks; clipping weeds, and improving or building weirs and diversion boxes for irrigation purposes.

As incentives for superior records of achievement, merit awards are offered by the Firestone Tire & Rubber Co. on county, State, sectional and national levels. Awards include 2,948 gold medals for county winners, and United States Savings Bonds for the 6 highest-rating participants in each state amounting to $13,800. In addition, 16 selected State winners receive a sectional award, an educational trip to the National 4-H Club Congress in Chicago. Eight of the sectional winners are chosen for national honors, each receiving a $200 college scholarship. In short, 3,248 participants in the activity have an opportunity to win an award for outstanding work in controlling soil erosion and improving land use.

The activity is arranged by the National Committee on Boys' and Girls' Club Work, and conducted under the direction of the Federal and State Extension Services.

One of the chief objectives of 4-H Club work is to encourage members to "learn by doing." That they are carrying out that objective is evidenced in the 4-H'ers' records, a few of which follow:

George Scott, 19, of Fort Collins, Colo., drafted and launched a comprehensive soil-conservation program on his father's 140-acre farm in Larimer County. Last year he carried this work still further, seeding the banks of irrigation laterals in a large field to grass, cementing a 100-foot ditch, tiling a tract to replace a stream which prevented cultivation of 1½ acres. He also sprayed pastures to control weeds. In addition, he rented and placed under soil conservation a nearby 40-acre farm containing two streams and a river which will be devoted to trout fishing. George did most of the work on the fish hatchery and small ponds, and is building a 750 x 150-foot pond.

Larry Torrance, 17, in partnership with his father, successfully shifted production on their 156-acre farm near Milledgeville, Ga., from cotton to livestock and feed, through erosion control and improved land use practices. Last year 55 acres of pasture were cleared, fertilized and seeded; 29 acres of woodland were fenced, lime, and phosphate were applied where soil tests showed they were needed, and terracing and contour strip cropping were used extensively. Balanced rotations are in effect. Larry also planted and sodded several waterways, and maintained a 1-acre forestry demonstration plot.

Rapid progress in establishing a complete soil conservation plan on his father's 78-acre farm has been effected by S. Douglas Voight, Jr., of Amite, La. Having mapped the farm in detail, Douglas in 1945 laid out and built terraces where they were most badly needed, established a permanent pasture, sowed Austrian winter peas as a cover crop in a large field, and blocked a gully with a log and brush dam. He also spread 15 tons of limestone and 3 tons of phosphate on his home farm, and helped an uncle plot and build terraces on a nearby tract. In addition, he has protected 40 acres of timber by posting "No Smoking" and "Put Out Fire" signs.

Efforts of Roger W. Teater to check soil losses and build up the fertility of his father's 57-acre farm in Jessamine County, near Nicholasville, Ky., proved successful in producing higher crop returns. Last year, as the result of Roger's work, every cultivated field on the farm was

An Illinois 4–H Club member learns some startling facts from run-off plots.

contour strip cropped and later planted in cover crops of vetch and rye, with an 8-year rotation plan in effect. He was host with his father at a soil conservation demonstration in which a ditch was dynamited to drain two small fields last spring, providing an outlet to a small stream. During the summer he clipped 26 acres of pasture to control weeds. Roger's plans include terracing 15 acres to be used as a permanent pasture and building a cement trough at a spring on the tract.

Willie Rae Howe, 19, with his younger brother helps his widowed mother operate a 264-acre farm near Whelling in Livingston County, Mo. Last year Willie seeded a grass waterway in a 20-acre field preparatory to terracing, and completed a water management plan for an additional 80 acres. He limed 150 acres, and applied 10 tons of fertilizer on the farm each year for the last 2 years. He is also carrying out a fertilizer demonstration project in cooperation with the county farm adviser.

Impressed by the heavy losses of soil by erosion on his family's five farms, Robert N. Mason, 20, of Ontario, N. Y., last year began an extensive soil conservation program, using a 97-acre tract near his home as a model. One large field was drilled to wheat on the contour and another strip cropped. To drain two muck fields, 4,300 feet of ditches will be evacuated; 1,200 feet of drainage tile will be placed in a third field. A number of diversion ditches also will be dug. Two other tracts will be merged for strip cropping, and the farm woodlot will be enlarged and fenced.

With his father, Howard B. Goodnow, 15, of West Swanzey, N. H., dismantled 100 feet of stone wall, carried away the rocks, and changed the course of a stream by building a sod dam and cutting a new channel. A large field was drained by blasting a ditch, which was done by employees of the United States Soil Conservation Service. Howard also cleared underbrush from a ¾ acre of land, which is being seeded, and with his brother applied poultry manure to a pasture.

Robert C. de Baca, 16, of Newkirk, N. Mex., who completed his third year of conservation work in 1946, placed 510 acres of his father's 2,400-acre ranch under deferred grazing, seeded 50 acres to Johnson grass, applied manure to 40 acres and terraced two smaller fields. He also built three gully headcut structures of rock and brush in pastures, constructed a gully plug and placed brush and rock spreaders in two fields.

After 3 years of work, Eugene Ross, 16, is approaching his goal of making his father's 80-acre farm at Warner, Okla., a model of improved

William M. Abbott, a state soil conservation winner, toured his state to learn as much as he could about soil conservation practices. He came to the conclusion that "it is fortunate that there is as much top soil left as there is, even though there is very little in most places."

land use. With his father, Eugene terraced and contour planted cropland and pastures, and used recommended pasture mixtures of lespedeza, Bermuda and rye grass. A permanent woodlot was fenced off for timber production and game protection. A dam was built to provide water for livestock, and the main waterway on the farm was planted to grass.

Conservation plans were prepared on 127,000 farms and ranches in districts during 1946, with the assistance of SCS technicians. These new plans contained over 33,500,000 acres. Complete treatment was carried out by farmers and ranchers on about 19,000,000 acres in the one year.

At the end of 1946 there were 424,372 active conservation plans, comprising 116,646,256 acres in districts. Treatments as planned had been carried out on about 57,140,426 acres.

GREECE Looks Ahead

By F. G. RENNER
Chief, Range Division, Soil Conservation Service

Explanation on Following Pages

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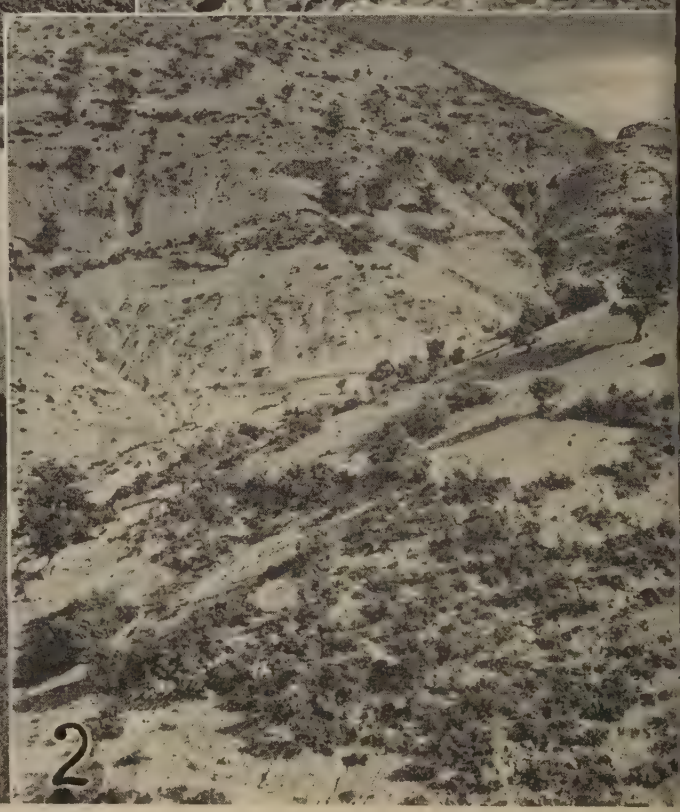

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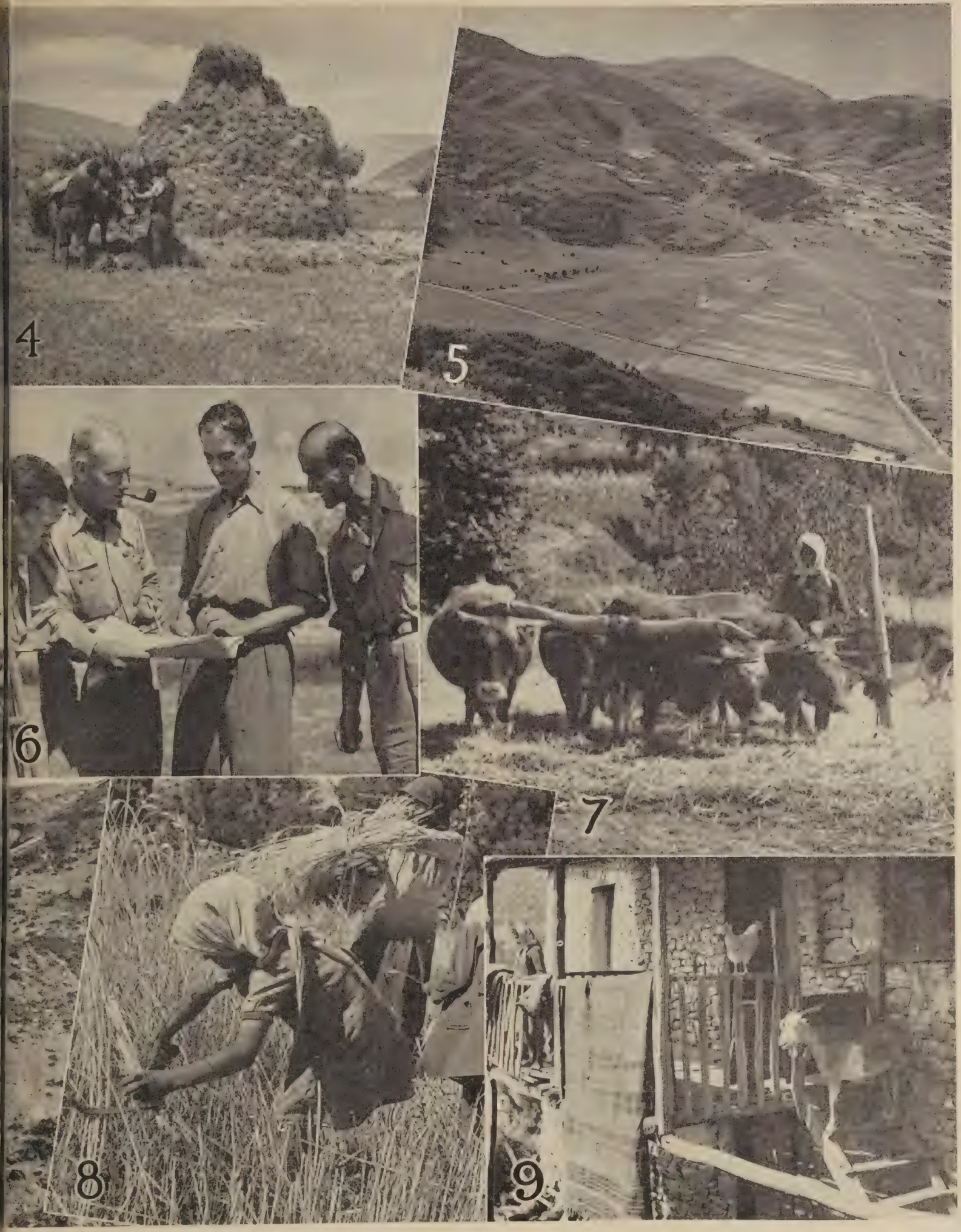
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Shortly after the end of the war, the Greek Government turned to the United Nations Relief and Rehabilitation Administration for help in improving Greek agriculture. It was recognized that the mountain villages had never been able to make more than a scanty living; that both mountain pastures and valley lands were seriously eroded, forests badly depleted, and additional irrigation and drainage urgently needed. Ministry officials had come to appreciate, too, that unless these basic causes of low agricultural production could be corrected, the extreme poverty among rural people would continue indefinitely. It was evident that any attempt to rehabilitate Greek agriculture would have to give major attention to conservation of the soil.

Accordingly, UNRRA was asked to provide the services of a group of scientists, to make a survey of conservation problems, and to develop specific plans for the improvement of conditions on a number of areas. It was expected the findings of such a survey would serve both as a basis for an immediate program of action and as a foundation for similar conservation projects in other parts of Greece, particularly in the mountainous sections.

After examining a number of areas, the Vouraikos drainage was selected as the first to be studied. Originally the mountainous area of this watershed, like much of Greece, had been forested with fir at the higher elevations and holly oak on the lower slopes. Many centuries of heavy population have brought vast changes in both the appearance and character of the original forest. Much of the mountainous area has been cleared and used to grow wheat. Many of the steeper slopes have eroded so badly that they have been abandoned for cultivation and are again slowly reverting to oak brush. The grazing of the area for centuries by sheep and goats has also changed both the vegetation and the land. With the exception of a few small areas, the original oak forest no longer exists. It has been reduced to brush, a foot or two in height. Many trees and shrubby species that were probably once abundant have been almost eliminated by centuries of overuse.

Soil erosion, resulting from heavy grazing and unwise farming practices has seriously damaged much of the agricultural land, even on moderate slopes. During flood periods, which occur nearly every winter, a great deal of surface soil is removed from the steeper slopes. With it goes much coarse cobble and gravel. Most of this erosion debris is deposited in cone-shaped fans in the valley. These fans have blocked the main stream channels and transformed much of the fertile meadow land into swamps, thus further reducing the available agricultural land. The finer sediment is spread over the entire valley floor or carried down the main river to the sea. Most of the soils are poorly developed and low in organic matter because of this continuous erosion and deposition.

Like many older agricultural areas of the world, the region is densely populated, with far more people than its depleted natural resources can adequately support. In this particular watershed nearly 10,000 people are attempting to support themselves on 62,000 acres, most of these acres eroded, some of them waterlogged, and all of them reduced in productivity.

The present types of farming operations are far from conducive to protection of the soil resources. The average family owns or rents 1.5 acres of irrigated land, 8 acres of dry-farming land, 24 acres of mountainside grazing land, and 5 acres of mountain forest. The lower natural terraces are in grapes, or where irrigation is possible some of them may be in corn, with wheat in alternate years. Many of the steep slopes of the mountains themselves are in wheat, which too often extends over fair soils and poor to the highest summits.

In spite of the large number of domestic animals, particularly goats and sheep, there is almost no livestock industry as an enterprise separate and distinct from farming. In most cases, the livestock are owned in small numbers, each family having from one to four head of goats, a like number of sheep, and a donkey and an ox for draft and transportation. These animals are essentially members of the Greek farmer's family. They accompany him to the fields in the early morning, stay with him all day, and return with him to the village at dark or after, to share the same roof.

In Greece, as elsewhere, land and its use is reflected in the living conditions of the people who depend on it for their livelihood. Destruction of the land resources and the accompanying poverty has reached the point where most of the families

Note. — With the author on this mission were Grover Kinzy, agronomist; J. E. Flanagan, irrigation and drainage engineer; M. B. Dickerman, forester; Claude L. Fly, soil scientist; and Ch. Panayiotides, agriculturist from the Greece Ministry of Agriculture.

in the area studied have little or no money even for the purchase of necessities. Education, recreation, and cultural pursuits are almost beyond their reach. To maintain a bare existence, more and more land has been cultivated, much of it not adapted to farming. For the good of both land and people far too much land has been used for wheat and too little for fruits, vegetables and improved pasture to produce livestock products for family use.

Primitive methods of cultivation require long hours of hard labor in the fields. Much of it is performed by the women and children who also have to take care of such usual household duties as cooking, spinning, and weaving. These are particularly laborious because of the lack of such ordinary conveniences as running water, cooking utensils, and lights. Only the crudest equipment is normally available. Bread is baked in an outdoor oven, but most other foods are prepared in a pan over an open fire. Because of the drudgery and time involved, the Greek peasant family usually has only one hot meal per day, and one cooked dish per meal.

In spite of the depleted condition of the land and the poverty-ridden condition of the people, the survey indicated astonishing improvements could be brought about within a short period, with relatively little effort. It was found, for example, that the irrigated land in the watershed could be increased 55 percent by a simple drainage system that would reclaim lands now too wet to cultivate. An additional 23 percent of new lands were found suitable for irrigation farming. This makes a possible increase in irrigated land of 78 percent. Such lands, of course, would be the most productive in the watershed. Acre for acre they should produce several times as much as the eroded, dry-land slopes.

The area available for dry-land farming could also be nearly doubled by replacing the every-other-year fallow system with continuous cropping. Without means to keep down the thistles and other weeds, the present system is of little benefit. If the proper changes in land use were made, many of the steeper eroding slopes would go back to brush; and still the area available for crops each year would be greatly increased.

Forage supplies could be increased tremendously. The yield of corn, 80 percent of which is fed to livestock, could probably be quadrupled by the introduction of modern hybrid varieties in place of the ancient short-eared, 8-rowed flint type now grown. Alfalfa, wild peas, white, yellow, bur and sweet clover and vetch grow wild in the area; but aside from a few patches of alfalfa, very little use is made of any of these valuable legumes. The planting of some of these legumes with Italian ryegrass in the standing corn in August or immediately after harvest should greatly increase green pasturage from November to late April. This would also prevent much of the erosion of these lands during the period they are now bare. Where corn and wheat are alternated, planting sweetclover and ryegrass in the wheat should provide a green-manure crop and increase the pasturage from July to late April.

Greek sheep produce less than two and a half pounds of wool and about 50 quarts of milk annually; while the clip from the goats is less than three-quarters of a pound and the milk production about 60 quarts. The amounts of milk, wool, and meat produced could easily be doubled, even after the numbers were reduced to the capacity of the land. This could be done by improving the quality

(*Continued on page 236*)

CENTER SPREAD

0. The Greeks have used crude brush and rock terraces since ancient times. Few are well maintained and many are on slopes too steep for permanent cultivation.

1. The forest of the Monastery of Ayios Lavra which has been protected from fire and excessive grazing since the monastery was founded about 900 A. D. Much of the mountainous area of Greece probably once looked like this.

2. In contrast to the monastery forests, much of the mountainous area of Greece now looks like these denuded and eroding hillsides. Faint remnants of rock and brush terraces indicate the slope to the left was once in cultivation.

3. A fallow field with its usual cover of thistles. With ample rainfall from October to June, a fallow system is unnecessary and production could be doubled if wheat were grown each year with winter annual legumes and fertilized.

4. Areas too wet for cultivation produce swamp-grass which is cut, bundled, cured, and hauled several miles to the village for winter feeding. If such areas were drained they would grow excellent alfalfa or pasture to relieve the overgrazed brush-covered slopes.

5. Much of the best farm land in the valley bottom of the Vouraikos has been covered by such fan-shaped cones of rock and sand washed down from the upper slopes.

6. The author, together with the engineer and interpreter of the mission, explaining the proposed drainage system to the president of the village of Kertezi.

7. Due to the small size of their land holdings, each family laboriously threshes its own wheat with slow-moving oxen or donkeys.

8. Women and children do much of the farm work. The wheat is cut with a hand sickle and tied in bundles to be hauled to the village on the back of a donkey.

9. Centuries of land impoverishment are reflected in the living conditions of the people. The houses of the Greek farmer are of stone but few have lights, heat, or running water or anything but the barest of furnishings. The chickens, goats, and donkeys occupy the ground floor.

CREDIT for Soil Conservation

By E. C. WEITZELL

CREDIT for financing the application of soil conservation measures and practices is a comparatively new type of investment. Although investments in farm and forest lands usually have been based on the concept of permanent or perpetual incomes, the idea of "additional" investments to insure the assumed permanency of land value is new to most potential creditors. Short-term loans for seed, fertilizer and other production supplies are common practices in most farming areas. The difference between production credit and loans for conservation is one of emphasis only. Whereas production credit usually is for a single production cycle, the objective of conservation is to maintain a desired level of productivity over a long period; and if adequate maintenance is provided, the benefits should accrue in perpetuity.

THE need for capital investment and reinvestment for soil conservation arises out of past neglect and failure to expend currently for maintaining soil resources. The accumulation of these deficits makes it necessary to reinvest to the extent that it is desirable and economical for rehabilitating productivity. In addition, certain measures and practices are required to protect and conserve farm lands when they are removed from nature's protective custody and submitted to uses which may result in depletion and erosion if essential conservation measures are not provided.

The amount of cash required for installing a program of conservation farming may vary considerably. In some areas conservation may consist of practices and simple measures that farmers can apply, if they are provided with adequate technical assistance. In other areas, and especially on those farms that have been allowed to erode and deteriorate severely, conservation may require comparatively expensive measures and practices. Labor and machine work, together with materials for masonry installations, tree plantings, protective fencing, and fertility improvement, may involve substantial cash outlays. To the extent that cash is required, suitable credit may be a desirable facility for supplementing the capital that farmers may be able to provide from savings and current earnings.

Another need for credit may arise in those instances where the enterprises or systems of farming must be changed in behalf of soil conservation. It may be that cash crops are partially replaced by pasture and sod crops, resulting in a need for enlarging or initially establishing livestock enterprises in order to make the conservation system of farming work. Some farms are too small to be able to follow the type of farming that would permit conservation. It may be that land could be obtained for enlargement, and the provision of economic operating units, if credit is available under acceptable terms. Well-planned credit for these purposes may be of greater value in some instances than investments in certain mechanical measures for controlling erosion. The elimination of the cause of depletion should precede the treatment of "ill" land. A reasonable degree of operating economy, and land use adjustment are essential to the feasibility of conservation farming. Because adjustments in the operating units may be an essential requisite to the success of conservation programs, it may be desirable to make joint loans for the two purposes.

The intelligent provision of credit for soil conservation depends on four basic conditions: (1) The character of the program to be installed;

NOTE.—The author is an agricultural economist, Bureau of Agricultural Economics, Washington, D. C.

(2) an adequate appraisal of the benefits to be derived from soil conservation; (3) the availability of loan capital at rates of interest and repayment terms consistent with the amount of benefit that may be expected and the time-pattern of their occurrence; and (4) the possibility of acceptable security for guaranteeing repayment.

In the first place, any program of soil and water conservation to be financed by private investors and creditors must make a contribution to the economy of land use and farm operation at least equivalent to the accepted earning standards for private loan capital. This means that those features of any program which are designed to produce benefits of a "social" nature should not be included in private financing plans. Measures of this character include those from which the benefits accrue to the general public, or during periods of time beyond the scope of existing interests. These limitations do not imply that investments beyond the realm of existing private interests may not be desirable. However, the cost of social improvements should be financed by public subsidies or other types of puolic investment. In those cases where social or public values are inseparably tied up with the achievement of private benefits, the investment necessarily may be a joint responsibility.

Private investments for soil and water conservation must be justified by (a) resulting increases in expected future incomes, or (b) the prevention of reductions in future incomes. To determine whether any suggested program will produce increases in future incomes adequate for justifying the investment demands that the expected benefits be estimated within a reasonable margin of error.

It will bear pointing out that data indicating the probable benefits that may be expected from any specific combination of practices applied to a particular kind of land is fragmentary and incomplete at best. And for most land conditions the available information is entirely inadequate for appraisal purposes. The compilation and economic interpretation of experimental and practice data, as guides to cost-benefit appraisals, will be invaluable to the development of sound investment and credit programs for financing soil conservation. Adequate cost-benefit appraisals will require basic data indicating the amount of net benefits that may be expected, and the time-pattern of their accrual, including the relative permanency of the improvement in terms of maintenance and replacement costs. Without going into detail concerning the appraisal analyses, it will be well to discuss a few of the points involved.

First, it is essential that the conservation investment be planned so as to maximize the resulting net benefits. Second, in order that the net benefits may be capitalized as the value of conservation, adequate allowances must be made as returns to labor, management and other associated factors. Third, it is necessary to discount the series of infinite or terminal annual net benefits in order to eliminate the factor of risk, and to convert values extending over a period of time to "present value". The present value of the expected net benefits is a measure of the amount of security that is expected to be available, as a basis for conservation investments.

The planning of a soil conservation loan for any specific farm involves detailed analyses of the entire farm business. The basic point to keep in mind is that the planning of this type of credit must be based on the total ability of the farm business to meet the obligation. Justification for the investment is limited to expected net benefits from conservation. But since farm income accrues as a composite of a number of factors, and is used for the most urgent purposes, it is obvious that credit obligations must depend on the repayment capacity of the entire farm unit.

In this connection the potential creditor will be interested in ascertaining that the farm is adaptable to reasonably efficient operation, and that it is likely to be operated accordingly. Creditors also will be concerned about the financial status of the farmer and his business, in relation to the expected returns from conservation. It should be observed that if prior income obligations will exceed the total income that may be expected with conservation, additional credit may not be feasible. Thus, the debt repayment ability of the farmer is the first order of importance in any credit consideration.

In evaluating the feasibility of credit as a financial aid to conservation, farmers will always be concerned about the annual "cost" of a proposed investment. In other words, they want to know how much cash will be required annually to pay off the credit obligation. The repayment schedule is important from several standpoints. (a) In terms of total farm income and previous obligations the farmer must determine his relative ability to handle additional credit; (b) it is desir-

able to accept credit obligations only on the basis that they can be repaid during the life of the improvement, and (c) it is desirable to plan the repayment schedule in conformity with the flow of expected benefits from the improvement, unless other unobligated funds are available.

As a basis for considering these points, the proposed loan may be projected as an amortized repayment schedule. For example, it may be assumed that a specified program of soil conservation will require investment credit in the amount of $4,000; and that it is desirable to make the total loan available in three installments as the funds are required: $2,000 for the first year, and $1,000 for each of the following 2 years. Interest will accrue at the rate of four percent from the time each portion of the total is released, but amortization will not commence until the fourth year.

It is determined that a 20-year period is a suitable and acceptable loan period, and the money is available at an interest rate of four percent. To amortize this obligation over the 20-year period, beginning with the fourth year after the initial amount is made available, will require the repayment of 20 equal annual installments, including interest and capital. Thus, the annual payments will be $294.33, plus $27.32 for amortizing the accumulated compound interest on the funds advanced during the three years prior to the time repayments begin. The total annual requirement for loan service would be $321.65. It is obvious that the requirement for any specific loan value will vary, depending on the rate of interest, the length of the repayment period, and the arrangements for advancing funds prior to the start of repayment. Of course, repayment schedules need not be annual, and they may be variable The amortized plan indicated above is only an example for portraying the considerations that must be taken into account.

It may be well to observe that the assumed $4,000 loan is not meant to be typical. This amount may be low for farms in some localities and high for those of other characteristics. In any event, to the extent that farmers are able to pay cash, or to install conservation measures and practices by using available family labor the necessity for credit will be reduced.

The available instruments of security for conservation loans are familiar to most farmers and investors. Investments for soil conservation are investments in land; consequently the income from land must be the security. In this respect mortgages for securing conservation loans do not differ basically from any other real estate mortgage; and they may be more desirable in that the maintenance of the security is a major objective.

In most instances credit for conservation is likely to require intermediate to medium long-term security. This means that a first or junior mortgage on the land to be improved or conserved is the most acceptable type of security, where short-term unsecured credit is not available or adequate. If loans for conservation purposes accompany initial mortgages, or if the land is not otherwise encumbered, they may be included in the first mortgage without difficulty.

Short-term credit for lime and fertilizer is more or less customary, but long-term credit for these and other elements that constitute a program of conservation is not likely to be popular until adequate cost-benefit information is made available for justifying the latter procedure.

Insofar as the desirable length of the loan period is concerned, only one stable rule can be advanced. If the value of any improvement is limited to a certain number of years, all outstanding debt against it should be paid off during the productive life of the improvement. Beyond this, the selection of desirable loan periods is dependent on judgment decisions relative to the availability of repayment money, the degree of risk involved, alternative investment opportunities, and other related factors.

From the standpoint of the farmer-borrower there are some factors in favor of rapid repayment, while others may favor long-term credit. For example, long repayment terms add to the net cost of credit, unless farmers are able to offset interest costs by investments of similar or greater earning capacity. Many farmers may not recognize alternative investment opportunities even though they may exist right on the farm; consequently they lack the facility to offset obligated interest. However, to the extent that farmers are able to invest available funds, it may be desirable to delay loan repayment in order to take advantage of current investment opportunities.

Insofar as the creditor is concerned, greater length to the loan period may add to the risk involved, unless there is assurance that the improvements will be maintained and that their estimated earning capacity is perpetual. If risk

is not a factor, creditors may favor long-term investments in order reduce reloaning costs.

In general, repayment schedules should conform to the expected pattern of benefit accrual, which may vary widely depending on the type of measure employed. In other words, credit plans should anticipate a pattern of additional income to result from conservation from which the debt may be liquidated. Otherwise, repayment of debt should be planned so as to prevent the overburdening of current incomes, part of which may be needed for maintenance and other variable farm costs. And unless there is some advantage to be gained the time should not be prolonged more than necessary. Variable repayment plans, depending on the availability of income may be a decided encouragement to credit investments for conservation.

The job of conservation does not end with the initial installation of a system of measures and practices. This program must be maintained, if credit can be advanced safely; and our discussion here assumes that the expected net incomes from conservation, on which credit plans are based, are over and above all costs, including that of maintenance. But what reasonable guarantee does the creditor have that careless farmers may not neglect the conservation program, and permit the loan security to "waste away" as time goes on?

Two angles of this question are important. *First* the loan security must be protected. *Second,* if public credit agencies provide various inducements in the form of low interest rates for example, they have a right to expect a reasonable level of conservation, even though the farmer might be inclined to exploit his land while repaying the loan.

Two or three procedures may increase the probability of maintenance. More intensive education relative to the values of conservation practices over time should reduce the risk of failure to maintain soil conservation measures and practices. For those farmers who recognize and follow the economic aims of good management this should be no problem. But poor management is always prevalent, and it must be recognized as a risk.

Technical supervision and assistance for soil conservation credit clients would not be far different from the supervision provided to service rehabilitation and tenant-purchase loans under existing government credit programs. Under the Soil Conservation district type of organization or as a function of any credit institution, supervision would seem to be a reasonable possibility. Two purposes might be served. Considerable encouragement and aid might be provided to farmers in behalf of achieving conservation, while the financial interests of the creditor were being adequately supervised.

A third and more drastic procedure might be followed. Legal instruments might be employed to insure maintenance, at least while debt contracts remain in force. An acceleration of debt repayment clause might be included in the mortgage contract, stipulating that in default of adequate maintenance of soil conservation the mortgagee may elect to declare the whole principal sum due immediately. Of course, adequate notice to the mortgagor and adequate opportunity for rectifying the default would be necessary. Injunctive action to restrain the wasting away of basic security is another legal procedure that might be followed. Past experience in employing this type of injunctive action has indicated two major limitations. (a) Accepted definitions of waste have not been sufficiently comprehensive. (b) And courts may be reluctant to enjoin waste, except the security is in danger of impairment. The first limitation may be corrected by including in the mortgage contract an explicit definition of waste. Such a definition should include both overt acts of commission, as well as negligently permitting the deterioration of soil conservation improvements. The second limitation could be overcome by specifically conferring on the mortgagee the right to injunctive relief on the occurrence of "waste" as defined in the agreement.

The extension of credit under favorable terms, would tend to speed the application of soil conservation measures. This procedure often may be more expensive than if the program were to be established more slowly, with greater attention given to the employment of natural processes for rehabilitating land resources; and by utilizing farm labor during "slack" seasons for building terraces and other measures. This is not to say that immediate and more costly application would not pay—depending on the relation between costs and earnings. When farmers face rising prices or stable markets, assuming costs to be constant, the benefits from conservation should be maximized by immediate installation. But if the future promises a sharply declining market for farm

products it may be well to encourage reductions in farm debt, rather than increases; and to enlist the forces of nature, available savings, and farm labor for establishing programs of conservation. It is quite certain that debt is more often conducive to exploitation than to conservation during depression periods.

Farmers might well consider their land as part of their banking facilities. During periods of favorable cost-price relationships their savings might be invested in the improvement and repair of their land. Then, during unfavorable income periods, they might draw on these savings, to the extent that they may be replaced. Where savings are not available, farmers may find that credit is their only recourse to achieving a continuing level of productivity and a reasonable return to labor and management. It is a common mistake for farmers to 'suffer along" with a depleted and erosion ridden farm, because of their personal desire to avoid credit. They need to realize that just as machinery and other capital investment works for them, soundly planned credit may be economically employed to assist them in the rehabilitation and conservation of the soil and the attainment of higher incomes.

GREECE LOOKS AHEAD

(*Continued from page 231*)

of the sheep and goats through the introduction of better sires and by making greater use of improved irrigated pastures instead of depending on the brush-covered mountain slopes for forage.

Altogether, over 50 specific recommendations were made to the Greek Minister of Agriculture. Descriptions of methods, plans, engineering designs, and specifications for improving the condition of the land and the people were included in the recommendations. If action is taken on only the major suggestions of the survey, agricultural production in the area can be doubled if not quadrupled within five years. If this improvement were to be extended to other areas where it is needed, it would materially raise the living standards of the Greek people, do much to bring about financial stability in the government, and might well be a material factor in insuring future peace in that part of the world.

REVIEWS

THE FURROW AND US. By Walter Thomas Jack. Dorrance & Company, Inc. Philadelphia, Pa., 1946. 158 pp.

"My place is under the Iowa skies, floored with the world's best soil and walled in by the emerald sky-line of native oaks," so writes Walter Thomas Jack in *The Furrow and Us.*

This book, I think, must be read with this man's robust soil in mind. Applied to agriculture generally, it lacks "geographical intelligence," a lack which always perturbed the late William Allen White, Emporia, Kans., about so many books written on American agriculture. Very few of our 6 million farmers live on soil as rewarding as that found in Iowa, the home of Mr. Jack.

A note on the jacket says "*The Furrow and Us* is the answer to *Plowman's Folly.* Man started with surface tillage for crop production but he abandoned it for the moldboard plow. *The Furrow and Us* is a recital of the practical and scientific reasons for making a quick return to the earth of all residues."

This book is not written by one who has recently discovered agriculture and then sets out to amaze the world with his findings. Here are a few paragraphs that should dispel any notion that Thomas Jack has not been up against the hard realities experienced by most midwest farmers during the last 30 years.

"The writer, back in 1917, embarked on an agricultural career as a life work and, on a fertile Iowa farm, soon found that the farm was the battle ground between man and nature.

"The going was good during the lush war years and the few succeeding years put no tax on personal ingenuity, for prices were good and if yields faltered and fluctuated somewhat, the gap between actual yields and maximum yields was spanned by high prices. There seemed to be no need for worry; old methods of doing things seemed quite adequate and the complications of the chemical nature of the soil seemed to be of no immediate concern. The soil had always responded to our call and whatever force kept it producing, the past years would surely keep production at normal levels.

"When the war clouds of World War I finally cleared, this writer like many other young farmers was not ready to meet the challenge of the wearing soil and falling prices. Soon the black clouds of economic disparity loomed up from every horizon, stealthily boring in, gaining momentum until it peeled the shirts from our backs and swallowed up the savings of millions. Many farmers who had purchased a farm, using up their lush-time savings as a down payment, were forced to relinquish and their savings only served to add more to the unearned increment of the previous owner. Some of us held on through pride and an unwillingness to accept defeat, and we did the only thing we could to meet a fixed expense-increase production. This, of course, was the wrong thing to do, since agricultural surpluses were already plaguing Washington, but if the normal acreage of grain crops and the usual livestock numbers would not meet current expenses, increase in production was the only way out.

"I had noticed that the soil stayed wetter in the spring; the water would run off the gentle slopes or stand in puddles on the level ground. It just couldn't soak into the ground. I was not aware that my shallow tillage methods had created a hard, impervious soil that would not store up moisture. I had not inquired into the reason why my corn fired sooner in hot weather. I was not concerned with the gullies that were cut, even on gentle slopes, and instead of sodding them I performed the usual predatory operation of plowing them in, increasing the valley in width and loosing the tons of precious top-soil.

"I had looked upon myself as an ordinary farmer, and this esteem was not surprising, for I had always kept abreast of seasonal jobs, and many times, before the advent of the tractor, had prepared the ground, planted and cultivated one hundred acres of corn without help. This was exclusive of the small grain and hay crops.

"There is little wonder then, that I had but little energy left for serious thought of the teeming universe in the earth that was ready and willing to work for me if given the chance. Nor of the vital natural laws, of which I knew but little.

"The force of circumstances was to change all this. I found that a few moments of the day spent in observing natural phenomena and a few moments in the evening reading the experiences of others, became an interesting and profitable habit. It gave me a sense of security and freedom from worry, for after all, worry is the result of lnefficiency.

"When you walk through your fields, reach down and grasp a hand-full of soil. Is it as dark in color as it used to be? Examine it closely and see if you can observe undecayed pieces of stalks or other small particles of organic material? Maybe you have replaced it and if you have, don't charge up the declining yields to luck or old mother earth."

Of course it is too early to tell how qualified scientists will evaluate this work. My guess is that most of them will be impressed with the author's grasp of the underlying basic principles involved in keeping a soil permanently productive. Perhaps some will disagree with some of his conclusions but most of them, I believe, will heartily agree that here is a working farmer who senses the full significance of the soil and what it means to all of us.

As to the recent controversy to plow or not to plow—that is, with a moldboard plow—I hardly feel that anything has been settled. It would be wonderful if we could dispense with the moldboard plow, for plowing requires far more power than any other job on the farm. At the moment we have no solution to the corn borer problem, other than to completely cover (or destroy) all infected crop remnants. And it is not clear yet how a farmer will be able to handle the weed problem in an intertilled crop during a rainy season if all crop residues remain on or near the surface.

Until we find solutions to these, and other, problems it is quite certain that the moldboard plow will continue in use. On the other hand, it seems equally certain that the practice of keeping crop residues on or near the surface of the land is feasible and practicable on far larger areas of cultivated land than are now being farmed under this system.—Glenn K. Rule.

DROUGHT *ITS CAUSES AND EFFECTS.* By Ivan Ray Tannehill. Princeton University Press, Princeton, N. J., 1947. 264 pp. Illustrated.

Climatology, which includes drought, is now in a stage during which a store of seemingly unrelated facts is being accumulated. The history of other sciences shows that eventually a point is reached when someone decides to suggest possible cause and effect relationships. This book may well prove to be one of the first steps to lead to the discovery of the laws of nature that govern not only droughts, but other climatic and weather phenomena. The author recognizes and repeatedly emphasizes the inadequacy of available information.

He calls the present approach to the study of climate the "classical point of view." He proposes in its stead what he labels the "objective point of view." This new point of view includes nearly everything that goes with the classical view. But, in addition, the objective view "demands variations in solar radiation." In this view, "climate is as changeable as weather" and "the basic controls of climate also control the weather." The most fundamental of all controls are: variations in solar energy; thermal properties of land masses, of bodies of water, and of the atmosphere; and movements of the atmosphere and ocean currents, induced by unequal heating of various portions of the globe (equator and poles) and modified by the rotation of the earth and by irregularities of the earth's surface (mountain ranges).

The author emphasizes the importance of the relative temperatures of oceans and continents. The dominant role of the Pacific Ocean in molding the climate and weather of the United States is strongly emphasized, ". . . we may strongly suspect that the Pacific Ocean is the monster in the back yard which seems to control our national rainfall, exerting a power that is second only to the sun itself . . ." The expansion and contraction of the Pacific "high" along the west coast, combined with the "sink" over Alaska and Canada, are the primary factors which determine whether the part of the United States *east of the Rockies* gets more or less than normal precipitation. The Atlantic and Medican Gulf are the sources of moisture, but whether and where this moisture is precipitated in the United States depends on the movement of cold air from the "sink." Causes for regional variations are traced to more specific manifestation of the all-important control—the Pacific.

The author's conclusions are that ". . . while the Pacific largely controls the amount of rain which is precipitated over the United States, the Atlantic controls to some degrees the distribution of the rainfall," and that "high sun and cool water make droughts on the border of the continent and low sun and warm waters make droughts in the interior." He analyzes variations in solar radiation, specifically, sunspots, and shows their relation to droughts and climate. Records obtained within the last century and geologic evidence are used to show that long-time variations in climate are determined by long-time variations in solar radiation.

One somehow gets a feeling that the author's case might have been stronger if less emphasis were placed on proving the various detailed conclusions. It would have, perhaps, been better to leave the proof to others. The value of the book is not so much in proving anything, but in postulating hypotheses to be proven or disproven by adequate facts collected with these hypotheses in mind. In the light of the recently acquired information, the "objective" view, outlined in this book, does not seem nearly so "preposterous" as it might have appeared a generation ago.

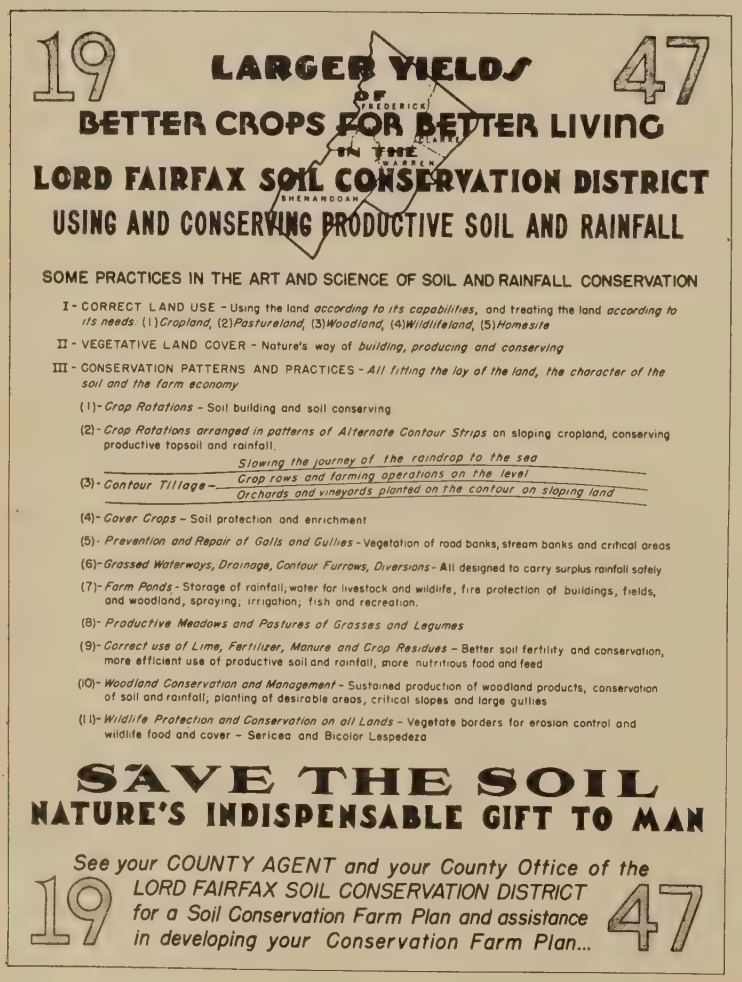
Anyone, who expects to find in this book simple, definite answers to such questions as "when and where will the next drought occur?" or whether and how drought, can be controlled, will be badly disappointed. The author's "objective" point of view does, however, lead him to some profound conclusions regarding the influence of man's activities on climate. He says, "Our climate has changed greatly as a result of clearing the land for crop farming, highways, pasturage and other purposes . . . we can see that any tendency toward an increase in the temperature contrast between continent and ocean in the spring and early summer months will deprive us of rainfall at the very time of year when it is most important to agriculture. . . . If all the vegetative cover were removed from the United States, there would undoubtedly be a remarkable change of climate . . . 'Hot winds of the plains' would dominate the weather in the interior, and the moist winds of the Atlantic and Gulf would be turned to the north and northeast with deficient precipitation even in eastern areas. Hot sun and cool water would produce spring droughts even in coastal areas . . . Floods would become more frequent and disastrous in autumn and winter. In general, our climate seems to have tended in this direction in the last half century." These statements, which may be hotly contested by some, echo the assertion of W. I. Vernadsky (see "The Biosphere and Noosphere," *American Scientist*, Vol. 33, No. 1, January 1945, pp. 1–12) that man is becoming a large scale geological force.

Man's conscious efforts to control climate have so far been limited to minute portions of the atmosphere. The author hints at much broader efforts, but warns that ". . . when and if we succeed in controlling the climate in more than a local and limited degree, we will need broad and

effective regulatory measures to make sure that changes which are advantageous in one area will not be allowed to produce disasters in other areas."

This book, in the opinion of this reviewer, carries two important messages. One of them is intended to make the laymen appreciate the importance of continuing and expanding certain meteorological observations (temperature of the Pacific Ocean, conditions of the upper atmosphere, solar radiation and the like).

The other message of equal, if not greater, importance is intended to get the meteorologist, climatologist, and scientists in related fields critically to reexamine the present approach in the light of recently acquired knowledge. If this message is heeded, we may eventually be able to understand ". . . how the 'sun can pick out South Carolina' and cause a drought in that State while some adjoining areas might have normal rainfall." It is, perhaps, to be regretted that the author combined the two messages in one book. As it stands, this is definitely not a book for the layman. The obvious attempt to write for both the laymen and technicians resulted in an excess of narrative and in repetitions, which do not help to clarify the concepts.—D. B. Krimgold.



FAST-MOVING VIRGINIANS.—One of the up-and-coming soil conservation districts in Virginia—Lord Fairfax—has undertaken to impress every level of its citizenship with the importance of the district's program for the soil's redemption. It has prepared a clever and informative leaflet, "Save the Soil," which is being handed out to 5,000 farm families, civic clubs, business and professional groups, garden clubs, parent-teacher associations, schools, rural churches, banks, and others. Twelve hundred farm women are being reached with it through four home agents working with 40 clubs. Lord Fairfax's aggressive, intelligent campaign of education has been favorably commented on by local newspapers and numerous other leaders of public opinion. Incidentally, all members of the district board of supervisors have recently entered subscriptions for Soil Conservation Magazine. Lord Fairfax district officers are determined not only to inform others but also to keep informed themselves!

MORE BEEFSTEAKS PER CALF.—H. B. Holmes, of the Highland Soil Conservation District, Marfa, Tex., tells the following story concerning increased production from practicing good range conservation on his ranch:

"When I asked for assistance from the Highland District 5 years ago, Soil Conservation Service technicians came out and made a thorough analysis of my ranch. When they got through, they recommended, among other things, that I reduce my breeding herd of 230 cows which I was carrying on my 8-section ranch, to approximately 180. I thought they were crazy and didn't know what they were talking about, because I was selling 420-pound calves. However, I sold 30 cows the first year and the next calf crop I sold, the calves averaged about 480 pounds. This opened my eyes, and the third year I reduced my herd more than had been recommended. When I got through selling that fall, I had only 160 breeding cows left. The next year I did not creep feed any, a practice which I had been following for several years, and my calves averaged about 530 pounds. I don't mean that was just the heavy end, either; that was the entire calf crop. It was these results that convinced me that good range conservation pays."

HOLD ON THERE, BAY STATE! An element of good-natured rivalry fans the fires of progress. M. W. Lowry, in a letter to the Editor, now raises his banner in defense of Virginia's claim to one of the "firsts" in district development; says he—

"I note in the April issue of *Soil Conservation* that mention is made of a soil conservation district in Massachusetts named after a person.

"You will be interested to know that five of the soil conservation districts in Virginia are named after persons:

"The Lord Fairfax District was named after Lord Fairfax, who helped colonize Virginia.

"The Virginia Dare District was named for the first white person to be born in the United States.

"The Thomas Jefferson District includes the area around Monticello, the home of Thomas Jefferson, one of the earliest soil conservationists.

"The Robert E. Lee District was named after the famous General of the Confederate Armies.

"The J. R. Horseley District was named after one of the first members of the Soil Conservation Committee of Virginia.

"None of these individuals is now living.

"In view of the above, we cannot concede Massachusetts a first in the naming of districts for persons."

REFERENCES COMPILED BY WILLIAM L. ROBEY

SCS personnel should submit requests on Form SCS–37 in accordance with the instructions on the reverse side of the form. Others should address the office of issue.

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[1] From the Superintendent of Documents, United States Government Printing Office, Washington 25, D. C.

The Prowers Soil Conservation District, Lamar, Colo., pays for 34 subscriptions to *Soil Conservation* Magazine. The East Canadian Soil Conservation District, Yukon, Okla., buys 21 subscriptions. One hundred copies go each month to the Waldo County Soil Conservation District, Belfast, Maine.

U. S. GOVERNMENT PRINTING OFFICE: 1947

Strip cropping in the Northern Panhandle Soil Conservation District, Marshall County, W. Va. This is on the farm of A. A. Maxwell, five miles east of Moundsville. The strips were established in the spring of 1936 and have been in continuous rotations since. The slope is 37 percent; when farmed with open-row, clean-tilled crops it is essential that all rows be exactly on the contour. (Photo by Hermann Postlethwaite.)

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CLINTON P. ANDERSON
SECRETARY OF AGRICULTURE

HUGH H. BENNETT
CHIEF, SOIL CONSERVATION SERVICE

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WASHINGTON, D. C.

In this Issue—

WELLINGTON BRINK
Editor
Art Work by
W. HOWARD MARTIN

SOIL CONSERVATION is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business, with approval of the Director of the Budget. SOIL CONSERVATION supplies information for workers of the Department of Agriculture and others engaged in soil conservation.

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BURIED CABLES.—With the increasing use of buried telephone cables, the Long Lines Department of the American Telephone & Telegraph Co. has become concerned with the problem of soil erosion. It has prepared a training course in erosion control for its engineering, construction and maintenance forces.

The preliminary training was conducted on a conference basis in Atlanta, Ga., last fall. Trial classes were held in Cleveland and St. Louis in January, out of which grew a standard training course. Thus far, approximately 175 Long Lines employees have been schooled in 13 classes, with more to be trained as requirements demand.

The course is designed to give an understanding of erosion processes, and of controls needed for protection of buried cables. With the selection of cable routes, construction methods, and soil controls best fitted to terrain conditions, the program is expected to result in lower maintenance cost for buried cable and improved conditions for rights-of-way.

The Soil Conservation Service cooperated in developing the course and in teaching the fundamentals of soil and water conservation. It is probable that various divisions of the company will ask individual soil conservation districts for assistance where intensive control measures are required.

—J. S. CUTLER.

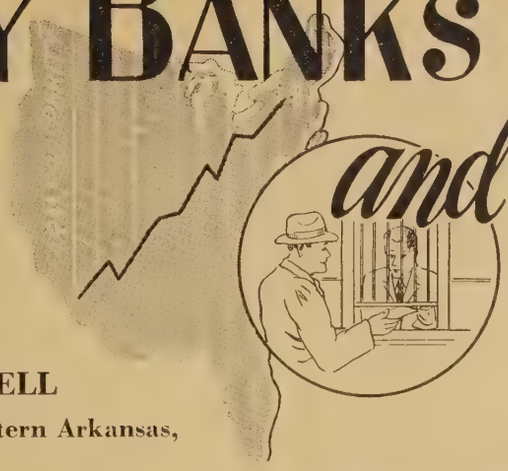
FLASH FROM OAK RIDGE!—Explaining his need for SOIL CONSERVATION magazine, E. A. Wende, chief, Department of Public Works, Atomic Energy Commission, writes to the editor:

"In the process of constructing buildings, streets, and access roads in this area, soil conservation practices are required. Part of this improvement by revegetation has been completed, but where grass mixtures have failed to survive, it is necessary to use drainage structures and larger plants.

"Construction programs are scheduled over the next several years and the engineers involved in the work desire to keep informed of advances in soil and water conservation."

THE COVER.—Introducing this issue is a scene which is typical of the new style farming. Caught by the camera of F. L. Hanes, it represents the contour theme favored on so many farms in North Carolina, one of the leading States in the movement toward soil conservation. This, farm, operated by P. E. Cobb, is situated near Summerfield. There will be little loss of soil or water from this field.

Country Banks and the Land



By W. W. CAMPBELL

President, National Bank of Eastern Arkansas, Forrest City, Ark.

Poor soil supports poor people. Bankers, of all people, should recognize the benefits that come by having good soil. Proper soil management is not merely a farm problem. The future of many of our towns and cities, in large part, depends upon the maintenance of the fertility and productiveness of the farm lands which surround them. When soil productivity is depleted the farmer becomes discouraged, his standard of living is lowered, and the income of the entire community goes down. People tend today to move away from poor farms, even though we no longer have a new land farther west. Rural communities develop and prosper, or wither and die, as soil productivity goes up or down. Soil productivity determines the trend, and the strength of the local bank measures the results.

The banker, as trustee of local funds, must look critically at this whole problem of soils and farm improvement. With this in mind, the Federal Reserve Bank of St. Louis conducted a series of case studies of the results of individual farm-improvement programs in an attempt to measure returns from investments in sound soil improvement practices. Thus far not a single instance has been found where a complete soil conservation and improvement program was not a financial success.

Soil conservation districts facilitate the job of protecting and improving our productive land. They serve as a medium through which we can all work to do our part of this job.

It has been my privilege to serve as secretary of the board of supervisors of our local soil conservation district since it was organized in 1938. From our experience, I agree with the basic principles announced by the Soil Conservation Service that every acre of land should be used in accordance with its capabilities to produce and every acre should be treated in accordance with its needs; or, to put it another way, a complete program of soil conservation should include (1) sound land use, (2) the right combination of conservation practices, (3) the maintenance and improvement of soil productivity, and (4) economically sound conservation farming.

Edd Hodges, Arkansas farmer, once knew this pasture as a cultivated field creased with large gullies. He sodded it to Bermuda and seeded it to lespedeza, yellow hop and Dutch clover. Dallis grass volunteered. A neighbor's cow, turned in to graze, increased her milk production half a gallon per day within a week.

We have found that we should change from row crops, mainly cotton, to a more diversified

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agriculture. This includes more livestock, more feed crops, more pasture, meadow and woodland, and the use of more land for orchards and cash crops other than cotton. We have found that we need a complete soil conservation program and should not attempt to concentrate on only one or two conservation practices.

This is part of a 200-acre pasture in St. Francis County, Ark., which has been sodded to Bermuda grass and overseeded with lespedeza, white clover, and Dallis grass.

He talks dollars and sense, this banker, W. W. Campbell.

We have found that applying the right combination of conservation practices pays big returns. I have in mind a farmer who 10 years ago was almost bankrupt. The productivity of his soil had been reduced to where it required 700 acres to produce about 200 bales of cotton. Corn would not yield enough to justify cultivation. Practically the entire production of the farm was going into interest and taxes. Payments on principal were impossible. Today, this man is free of debt and has money in the bank. He is producing 200 bales of cotton annually on 200 acres. He attributes his present circumstances to two things: (1) the adoption of an over-all soil conservation program planned by Soil Conservation Service technicians working in the South Crowley Ridge Soil Conservation District, and (2) the financial support his banker gave him.

I have in mind another farmer who bought a tract of land, including several hundred acres which are too rolling for practical crop production. The land had been overcropped and the steep slopes had eroded so badly you could see a network of gullies. He set out to develop the area into permanent pasture. The larger gullies were plowed in, and the fields were sodded to Bermuda grass and overseeded with lespedeza and hop clover. Today the gullies are healed over, a good stand of grass has developed, and this otherwise useless piece of land is providing an abundance of livestock pasture. Inside this new pasture a farm pond for livestock watering has been constructed. In addition to water for livestock, the pond has been stocked with game fish and is a source of recreation and tasty fish dinners.

I also want to tell you about a once valuable 320-acre farm which through exploitive practices had dropped to a point where crop yields were so low that it was difficult to obtain tenants. Ownership had passed to a mortgage company and the farm was definitely a liability to our com-

munity. Crop yields had declined to an average of 140 pounds of lint cotton and 15 bushels of corn per acre. This land was originally capable of producing a bale of cotton to the acre. In 1939, a progressive local farmer bought the place and put it under a complete planned program of soil conservation. The soil has been improved to a point where, in the last 4 years, yields have run about 550 pounds of lint cotton, 45 bushels of corn, 55 bushels of oats, and nearly 2 tons of lespedeza hay per acre. Pasture production has been stepped up

An Arkansas farm drainage ditch gets the attention of H. T. Barnett and J. E. Terry, technicians of the Soil Conservation Service.

from a maximum of 25 cows for 6 months grazing to where it is supporting 175 mature cows with an abundance of pasture for 9 months out of the year.

The pattern of production has changed considerably. Corn has been reduced from 100 to 60 acres, cotton from 100 to 34 acres. Oats, a new crop on the farm, now occupies 80 acres; lespedeza hay, also new, is harvested from about 100 acres. On the average, 115 acres of bur clover and vetch are grown as green manure crops. The permanent pasture has increased from about 60 to over 100 acres.

It required a sizeable volume of new capital investment to restore this farm to its present level of productivity. New capital input totaled a little more than $12,300 for fencing, building repairs, lime and fertilizer, green manure crops, and pasture development for the 6-year improvement program. While this investment was being made, increased crop production valued at $51,000, at average prices, can be traced to the farm-improvement investments. In other words, an average of $2,050 per year was invested in farm improvement during the 6 years. For this same 6 years, the average increased value of crop production was $8,500 a year. It will require a cash outlay of approximately $1,000 a year for lime, fertilizer, and green manure crops to maintain productivity where it is today. This maintenance outlay will return the operator through increased production of crops and pasture about $7,500 each year. The total value of crops and pasture produced on the farm, at average prices, has been brought up from about $3,000 under the old system to over $10,500 under the present plan.

You will recall that in 1939 farmers did not have the volume of cash reserves they have today. The buyer of this farm was no exception. Without a carefully planned loan program, he could not have financed the purchase of the farm or the badly needed improvements. I tell you with no little pride that our bank furnished the credit that was necessary. The results have been a source of great satisfaction to us. These figures which I have just given tell you better than anything else that I could say how quickly the credit was retired from profits directly traceable to the improvement investment.

To introduce a soil conservation program on a farm involves a capital investment. The size varies with the individual farms. The solid results, in terms of increased income which are shown by the records available from many farms, prove that such investments pay for themselves and therefore provide a basis for the sound extension of credit. Since soil conservation practices add to the productivity of the land, the land itself should be the security for the loan. This is sound because good soil is essential to good farm credit. The manner in which the farm is operated means as much as the value of the land when the loan is first made.

Loans for carrying out soil conservation practices on a farm should be made only after an overall, long-time conservation plan has been worked out. Drawing up such a plan is a highly technical job. Farmers generally do not have the technical ability to do it for themselves and must rely upon assistance from outside. It is important for banks to be sure that the plans are properly drawn. With

increasing numbers of agricultural areas having organized soil conservation districts, the services of technicians of the Soil Conservation Service are available to farmers. A farmer who requests a loan to carry out conservation practices should have such a plan in mind, understand how it will work on his farm, and have the ability and the initiative to carry it out. Special consideration should be given to the individual when making a conservation loan.

Credit terms for a soil conservation loan should be flexible. On some farms the soil conservation plan will call for practices such as liming, the growing of soil improving crops, fertilizing, and the use of good crop rotations which, comparatively speaking, would not involve unusual costs. Increases in incomes from such practices pay for them within 1 to 3 years. On other farms the soil conservation plan may require such practices as terracing, digging drainage ditches, and building farm ponds which require considerable cash for a year or two. It will probably take several years for such practices to pay for themselves from increased returns, but as soon as they are installed the appraisal value of the farm increases proportionately. In such instances you have a sound basis for reappraisal. The reappraisal can be made by adding the total cost of the capital items going on the land as a result of the conservation program to the appraised normal value. The reappraisal on this basis is certainly a good business practice and it enables a bank to maintain a sound margin of security while advancing credit for conservation farming.

On still other farms it may be desirable to retire some of the cultivated land to pasture or meadow. A loan may be extended, first, for fencing, seeding, fertilizing, and other costs to establish a good pasture or meadow. Then, within 2 or 3 years additional help may be required to buy livestock to utilize the pasture. Again it may take several years for increased incomes to pay off the investment for conservation farming. A combination of one or more of these conditions may exist on the farms that you deal with.

There are some areas in many communities where soil depletion is so far advanced or the soil is so low in fertility that it may not be economically sound for the individual farmer to attempt to install adequate conservative practices. It could be that the size of the farm is too small to be an economic unit when a conservation program is adopted. In making conservation loans, bankers must be alert to such situations and not attempt to finance programs that involve such obvious economic risk. The bank's best protection against such circumstances is to consider carefully the soil conservation plan for the individual farm involved, and figure on the basis of conservation estimates of increased incomes expected, based on what has been accomplished on other farms where similar practices have been carried out.

If properly planned, soil conservation loans offer a type of farm mortgage financing in which the real value of the security will be increased while the principal indebtedness is being reduced. Credit extended on this basis should be a constructive development from the standpoint of the borrower, the lender and the community.

We can assume that you are making a capital loan on a 100-acre farm that has just been cleared for cultivation, which extends for several years. Under the usual farm mortgage, the borrower is at liberty to follow operating programs that may be disastrously destructive to the soil resources of the mortgaged farm. As long as the borrower makes the required annual payments on his loan, there is little the lender can do to prevent undermining the very basis of his security. If something happens that makes the annual payments more difficult than expected, such as lower prices or adverse weather conditions, the borrower may be encouraged to deplete his soil resources much faster than ordinarily expected in an attempt to meet the payments. The security value may decline more rapidly than the unpaid principal on indebtedness is reduced. This has happened many times in the past. In fact, most farm mortgages do not include a clear-cut plan for proper maintenance of the soil resources. A soil conservation loan could prevent the farm from becoming a bad risk. If enough farms in the community are protected, it might prevent the entire community from becoming a bad risk. When enough farms are destroyed in a locality, the community is damaged and of course bank credit weakened. Bankers stand to lose as much, or more, than anyone.

It seems to me that the rural banker can logically assume leadership and appoint himself a committee of one to push an organized program of soil conservation in his community. Many bankers

throughout the country have individually inaugurated such a movement and the results speak for themselves. Unfortunately, however, the number of bankers who are thus active constitutes a rather small minority of the country banking group. I think the time is ripe for a general well-organized "back to the soil" movement for bankers. You are all familiar with the outstanding results accomplished in the field of agricultural development by such country bankers as our own Bill Bailey at Clarksville, Tenn., and many others. I shall not take time to recount the success of his program or the successes of the other individual bankers who have already waded into the problem. What we need is a program to make Bill Baileys out of every country banker in the South.

The challenge is here and with the challenge comes a marvelous opportunity. The oppportunity is at least threefold:

1. The opportunity to contribute to a stronger and more stable community.
2. The opportunity to build goodwill and larger totals for your bank.
3. The opportunity for sound investment of bank funds at reasonable rates.

The movement is on. Banker interest in soil conservation is high and growing. The ABA through the Agricultural Commission has outlined suggested programs that are excellent, but they are ineffective unless someone puts them into practice. Many of the agricultural committees of the State banker associations have developed outstanding programs for the soil such as awards for outstanding accomplishments in soil conservation. Such devices have proved very helpful in Oklahoma, Arkansas, and other States. At one meeting in Arkansas 23 awards were made to farmers from 3 counties. The event supplied a 6-page write-up in a recent issue of The Arkansas Banker. And yet, the full impact of banker influence in soil improvement will not be felt in the South until every country banker takes it upon himself to take part in the movement. Then, and only then, will the full pressure of organized bank effort be felt on the soil.

Bankers should be well enough informed to advise on problems of soil conservation or be able to tell farmers where to go for assistance. They should visit with their farm customers on the land and discuss the soil conservation practices that may be needed or that have already been installed. A word of encouragement from the local banker counts heavily with farmers and can be very effective in directing them into better farming practices. Through civic organizations and in other ways, the banker is in an excellent position to interest business and professional men, school teachers, and ministers.

I think the entire South is on the threshold of amazing economic developments in which great changes will be wrought in our systems of farming. It is a challenge to us as bankers to facilitate rather than to impair the progress of much needed changes in the rural economy.

In closing, may I repeat again that this whole matter of soil conservation, soil improvement, and farm diversification is a challenge and at the same time one of the greatest opportunities that has ever come to country bankers for constructive leadership in their communities. I have great faith in the good common sense of country bankers. I believe they will do the job.

DISTRICT REPORT.—Supervisors of the Limestone Valley Soil Conservation District in northwest Georgia don't believe in hiding their light under a bushel. They gave wide distribution to their 14-page copiously illustrated report for 1946.

Copies were sent to Senators and Congressmen representing the district, the Governor, members of the State Soil Conservation Committee, the Commissioner of Agriculture, the director of Vocational Education and heads of all agricultural agencies and other key people in the State, and to all agricultural workers, vocational agriculture and G. I. teachers, county officials, editors of newspapers circulating in the district, and all district cooperators.

Other copies went to the Secretary of Agriculture, Chief of the Soil Conservation Service, regional conservator, regional division chiefs, zone conservationists, land utilization project conservationists in the Southeastern States, State conservationists of Georgia and Florida, the local flood control staff, and chairmen of boards of supervisors of other soil conservation districts in Georgia.

C. H. Brand, of the Soil Conservation Service, presented copies of the report to the 150 persons attending a meeting of the Chamber of Commerce and Agricultural Club of Canton, Ga. Similar distribution will be made to civic clubs throughout the district when the supervisors meet with these groups.

When Chairman Gregory attended the meeting of the National Association of Soil Conservation District Governing Bodies in Chicago in February he gave copies of the report to delegates from the 45 states represented.

Foundation Sponsors Contest

Dr. Albert Bregendahl, consulting chemist, watches Ruth Williams run a test of soil taken from a plot entered in the contest.

By LESTER C. FOX

From the ground you see only a small part of the land at a time. The view is from eye-level, and you have long been accustomed to it. But from the air you can take in hundreds of square miles at a glance. You can see what is happening to the land—the bald places in the field where the topsoil is gone and the gullies that look like ugly scars.

For 18 years Lloyd Noble of Ardmore, Okla., has been getting a bird's-eye view of the land as he has flown about the country looking after his drilling contracting business. His flights have taken him from the oil fields of Michigan to the Northwest Territory within 70 miles of the Arctic Circle, over the prairies of southwestern Texas and New Mexico, and to the Atlantic seaboard. He has been disturbed by the soil erosion he has seen. He realized what the bald spots and the gullies meant. He knew that wind and water erosion were taking from the land its ability to produce. He began to wonder what he himself might do to change the picture, for he knew first hand that as the land declines the welfare of the people who live on it and depend on it also declines.

Note.—The author is information specialist, information and education division, Soil Conservation Service, Fort Worth, Tex.

Years before, Noble's father, the late Samuel Roberts Noble, had felt the effects of soil erosion. His thriving and extensive hardware business in Ardmore went on the rocks when his customers were unable to pay for the supplies and implements they had bought on credit. Old timers say that 50 years ago Ardmore was a leading inland cotton market, handling 54,000 bales in its peak year. Now the figure is down to 300 bales.

"That's what soil erosion does to the farmer and the businessman," Noble comments. "Trying to farm eroded and depleted land, the farmers did not have enough income to maintain themselves properly, much less pay for the things they needed to operate their farms. That is what made our so-called Okies—people who were gradually starving as their land moved out from under them to the point where they had to look for some other means of subsistence."

Looking down from his airplane on the general pattern of erosion, Noble decided to do something.

So Noble created the Samuel Roberts Noble Foundation in memory of his father, and turned over its affairs to a board of trustees, of which he is a member. While the trust agreement permits the Foundation to work in science, literature, education, and religion, it was Noble's conviction that the first concern should be for the conservation and improvement of soil, the Nation's basic resource.

The Foundation has begun by encouraging soil conservation and improvement in Carter County,

of which Ardmore is the county seat, and Love County to the south. Managing trustee is Francis J. Wilson, West Point graduate and retired colonel of the United States Army Corps of Engineers. He has a staff of a dozen laboratory analysts and field men. Cooperating with the Foundation are various publications, organizations, and agencies, including the Soil Conservation Service.

To create immediate and widespread interest, a $15,000 3-year cash contest has been started. The work of the Foundation during the contest will probably involve more than $100,000 additional expenditure. The contest has three divisions: Improvement of cropland and establishment of permanent pastures for adult competitors; cropland improvement for competitors 18 years of age or under; and garden growing. While the first 2 divisions are spread over 3 years, there will be not only the final prizes but yearly cash awards for progress. Prizes in the garden contest will be awarded annually. Ten-acre tracts are used in the main senior contests, with 2 of the 10 set aside as a check plot. Progress prizes will be awarded each year on the basis of soil conservation, soil improvement, increased production, and the cost and practicability of the methods. In the junior contest, one acre is used, with three-quarters treated and one-quarter untreated. Gardens are half an acre in size.

Entries closed February 1 with 357 contestants signed. As each farmer entered the contest, Foundation field men inspected his entry tract and took soil samples for analysis in the special laboratory set up in Ardmore by Dr. Albert Bregendahl, who has been employed as consulting agricultural chemist. On the basis of field inspection and chemical analysis, recommendations are made as to land treatment. The contestant, however, need not necessarily follow the recommendation.

Though primarily in the drilling business, Noble also knows farming. His mother and father were reared on farms in New York State. During his residence in Ardmore his father kept in close contact with farming through his business. His mother is one of the Foundation's trustees. Lloyd Noble himself is directly interested in agriculture, as owner of a number of farms and ranches in Oklahoma and elsewhere.

"On the farms will be found our greatest bulwark against dictatorship," Noble declares. "The man who feels secure enough to be without fear has an independence of spirit against which dictators cannot progress. This feeling is evidenced more by men who understand their land and its potentialities than by any other economic group. During the last few decades we have witnessed a movement away from the farm in many areas. If this trend is to be reversed, it is essential that we use the most effective known means to check erosion, as well as restore the productiveness of our depleted farms. Only then can we have confidence in the security of the government that our forefathers planned."

Noble believes that all of the world's troubles can be traced to fear, selfishness, and lack of understanding. It is his conviction that "aside from the acceptance of a sound religious philosophy, nothing can contribute so much to the solution of all these problems in every country as an increase in the number of people who, understanding their soil, have through it acquired confidence in themselves and a cooperative feeling toward their fellowman.

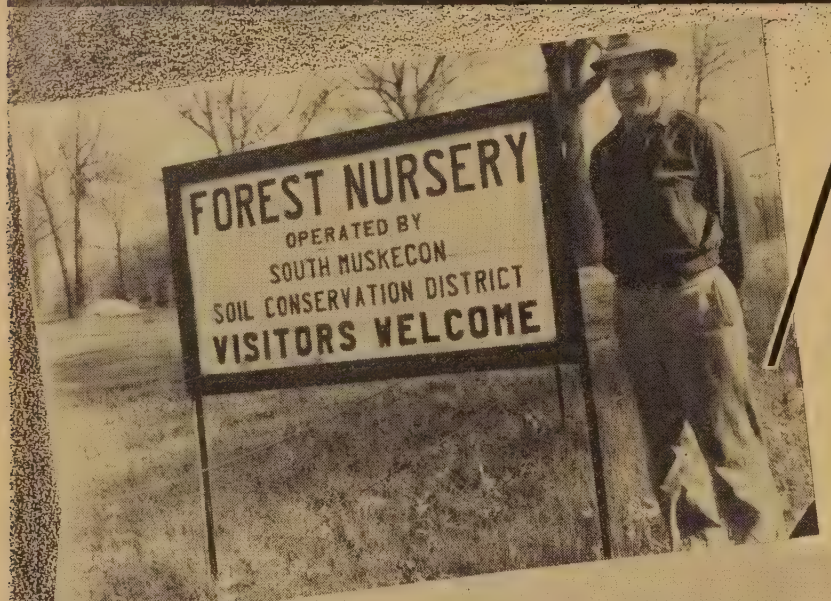
"Within the limits of its field of operations, therefore, this Foundation hopes to accomplish results that will help free the people of fear, reduce selfishness, and attain a better understanding among men."

It is the hope of the trustees that the land improvement accomplished through the Foundation's work will inspire others to undertake similar projects, and thus help speed up the conservation of soil resources throughout the Nation.

Lloyd Noble, advocate of land improvement, listens at his desk to the ideas of Col. Francis J. Wilson, managing trustee.

SOIL CONSERVATION DISTRICT

Tree Nurseries



THE PICTURES

At top, Victor Anderson, district director, and a big sign welcome visitors to the nursery.

At left, examining 2-year-old red pine seedbeds at the nursery operated by the South Muskegon Soil Conservation District.

Lower left, seeding has just been completed and ground is being rolled.

Below, blow sand in foreground, established 3-year-old red pine plantation beyond.

By JOHN W. KELLER

SOIL conservation district cooperators need 200 million trees annually. Sixty million are in sight for 1947. Can soil conservation district nurseries help meet the larger demand? Are district nurseries practical or must they be copiously subsidized with money, equip-

ment, and materials? Can they be entirely depended upon to produce a regular annual output of both seedlings and transplants? To get the answers to these questions, I spent a few days in western Michigan studying operating district nurseries, talking with Soil Conservation Service personnel, soil conservation district directors, county agents, and nursery managers, and checking both nurseries and percentages of establishment of plantations.

The district tree nursery movement began in Michigan, where 16 soil conservation work groups now are operating 21 tree nurseries. Although the first nursery was established 8 years ago, the idea has not spread to other States. Yet the nurseries are highly successful, and a tribute to the foresightedness of the soil conservation district directors who anticipated their tree-planting requirements and used this method to meet them.

The first district tree nursery was started by the West Ottawa Soil Conservation District in 1938 soon after the district was organized. Almost 5 million seedlings and transplants have been purchased by district cooperators from the nursery. It comprises 20 acres of land owned by a soil conservation district director and leased to the district for $1 per year. The second nursery was started by the South Muskegon District on about 9 acres. This area also is owned by a district director, and leased to the district. Almost 5 million forest tree seedlings and transplants from this nursery were planted by cooperators.

The ability of the nursery manager seems to be the key to success. If the district is fortunate in getting a man who is thoroughly interested in soil conservation, who understands how plants grow, and has good practical business ability, the nursery can be depended upon to produce good planting stock. In each of the three nurseries which I visited the nursery manager receives an hourly wage from the district while on duty and is responsible for all nursery operations. He makes up the pay roll and directs the work of the laborers who also are paid by the hour. At the peak of the season, none of these nurseries employed more than six laborers. The nursery manager collects the money for the sale of trees and turns it over to the soil conservation district treasurer once a week during the shipping season. He hires laborers and together they prepare the soil, sow the seeds, line out seedlings, operate the overhead water system, attend to weeding, fertilize the soil, cultivate and protect the tender young trees. The nursery manager is responsible for carrying out all of the many duties of his job.

In the fall of the year, the manager takes inventories, sends them to the district office where a return postcard is sent to each district cooperator whose farm plan includes tree planting. This postcard lists the species available for shipment during the next planting season and requests the cooperator to fill in the number and kinds of trees he will need on the return card and mail it to the district office. The manager, with limited assistance, digs, counts, bundles, heels-in the trees, and advises the cooperator when to call for his trees. The distance from the nursery to all cooperators in the district is short and usually the cooperator will bring a box and, if necessary, burlap bags so that there are no packing and transportation charges for the nursery to pay. The cooperator signs a form, agreeing to plant his trees for a forest crop.

The following policy governing the planting of trees from the district and SCS nurseries was adopted by the board of directors of the West Ottawa Soil Conservation District:

1. All plantings made will be of a mixture of two or more kinds of trees. One-half of the trees planted will be for a permanent forest, while the remaining half will be trees which will be thinned out later to improve the stand. The trees thinned out can be used for Christmas trees, pulpwood, and fuel wood.

2. All landowners within the boundaries of the district must become cooperators of the district before they can obtain trees from the district nursery. Occasionally the district will receive free trees from other sources which it may furnish free to district cooperators. These will be furnished in the same proportion as such free trees are to the total amount needed.

3. All landowners within Ottawa County, but not within the district, can purchase trees from the district, but are not entitled to any free trees (grown in SCS nurseries) from the district.

4. All trees must be planted for a forest crop, windbreaks, wildlife food or cover, and they will not be planted for ornamental plantings or resold with the roots attached, nor for planting within incorporated limits of cities or villages, except

NOTE.—The author is Assistant Chief, Forestry Division, Soil Conservation Service, Washington, D. C.

where an erosion problem exists or where the land to be planted is part of an operated farm.

5. All trees obtained from the district must be planted on lands in Ottawa County.

6. All plantings must be protected from fire and grazing damage.

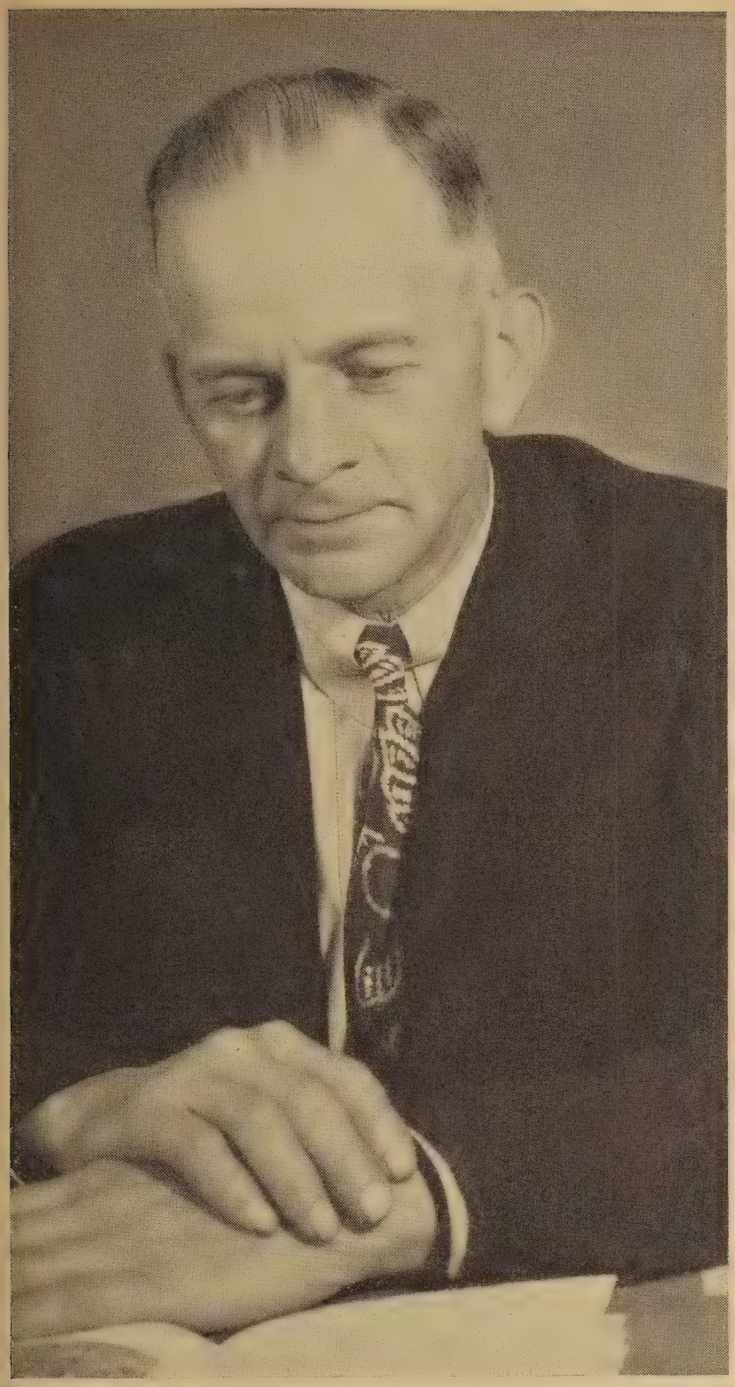
Some believed district tree nurseries had to be highly subsidized. This is not so. The county supervisors provide an appropriation of from $1,000 to $1,500 annually for soil conservation districts for district activities. A part of this appropriation is used for nursery operation. In some cases a used tractor, an old truck, or a transplanting machine has been supplied by the Soil Conservation Service. Technical assistance is furnished to the nursery manager by the work unit leader or a farm planner. This assistance, together with the office record keeping and all other details in connection with a nursery, is reported to average less than 2 weeks of a technician's time throughout the year. It never exceeds 3 weeks annually and no technical assistance at all is furnished by the farm planner to the South Muskegon District nursery. Those in charge of the soil conservation district office report that the office handles the nursery records and all other office work along with the regular district work, and that this is not a difficult job even during the busy shipping seasons.

The records of the West Ottawa Soil Conservation District nursery show that the district planted over 11 million trees up to June 30, 1946. Of this number over 5 million were purchased by district cooperators from the district nursery. Five million came from the Soil Conservation Service nurseries and 341,668 trees were grown in small farm nurseries of district cooperators. The remainder of the trees planted in this district were purchased from other public or private nurseries. The need for trees in this district is so great that district cooperators are urged to grow their own trees both in seedbeds and transplant beds.

Much of the credit for the success of the district nursery movement goes to farm agricultural agent B. R. Arnold. Mr. Arnold is not a forester but was largely responsible for the district tree-growing program. The success attained seems to take much of the mystery out of the forest tree nursery business. The records show that during the spring of 1946, 286 cooperators planted 690,000 trees grown in the district nursery and furnished in lots of 100 to 12,000. Red pine heads the list in number planted. This is followed by white pine, jack pine, pitch pine, Scotch pine, Norway and white spruce. Scotch pine and spruce are used mostly as thinnings for Christmas trees, so that the cooperators receive an early return from their plantations. During the first few years of operating district nurseries, both seedlings and transplants were planted in the field. Now it is agreed that transplants give the best results and practically all of the trees planted are transplants. Both 3- and 4-year-old transplants are used with the latter preferred.

Trees from the district nursery are sold to district cooperators for forest planting within the district at $5 and $7.50 per thousand for 2- to 4-year evergreen seedlings and transplants. The original price of trees to cooperators was $3 per thousand, but this had gradually been raised because of higher labor costs. Usually district-grown trees are cheaper than those grown in other nurseries. In 1946, evergreens grown in other public nurseries cost $8 to $10 per thousand. Due to the low inventory of nursery stock in other public nurseries in Michigan, sales were limited in 1946, to 1,500 trees of a single species and 4,000 trees of all species to any one person. In addition to the nursery cost for trees, there must be added the packing and transportation charges f. o. b. the nursery, which is the total cost to the planter. The low prices for district-grown trees are possible because of low nursery operating costs. Workers are paid only when they work. The land is leased by the district at a nominal cost, or in some instances, is owned by the district. The nurseries studied are remarkably free from weeds due to the soil treatment and care, so that weeding is a minor expense. All these procedures help keep down the cost of trees to cooperators.

A total of 50,000 out of the 238,000 acres of land in the West Ottawa Soil Conservation District must be planted to trees primarily for stabilization of sand blow areas. It is believed that this job cannot be done in time to save the soil with the limited number of trees that can be had from the Soil Conservation Service, the two Clarke-McNary nurseries operated in the State, and the privately operated tree nurseries. If the job is done, before a lot of the soil is blown away, the district nurseries must furnish a large part of the stock. But even if trees were available from other sources, the big advantage of district nurseries are (1) freshly dug



Olaf Hostad, who serves the South Muskegon Soil Conservation District in dual capacities as chairman of the board and as nursery manager.

planting stock which results in better survival, (2) availability of trees at proper times for planting, and avoidance of transportation troubles, (3) the educational value—the nursery belongs to the local people.

The pay-off comes with the high percentage of survival from trees grown in district nurseries. Representatives of the Extension Service, the Soil Conservation Service, and the soil conservation districts agree that the establishment with district nursery trees exceeds 90 percent and frequently reaches 95 percent. Checks of plantations show almost all trees growing. This high rate of establishment is possible because of the short time the trees are out of the ground, the short haul from nursery to planting site, and the absence of the usual packing and shipping hazards.

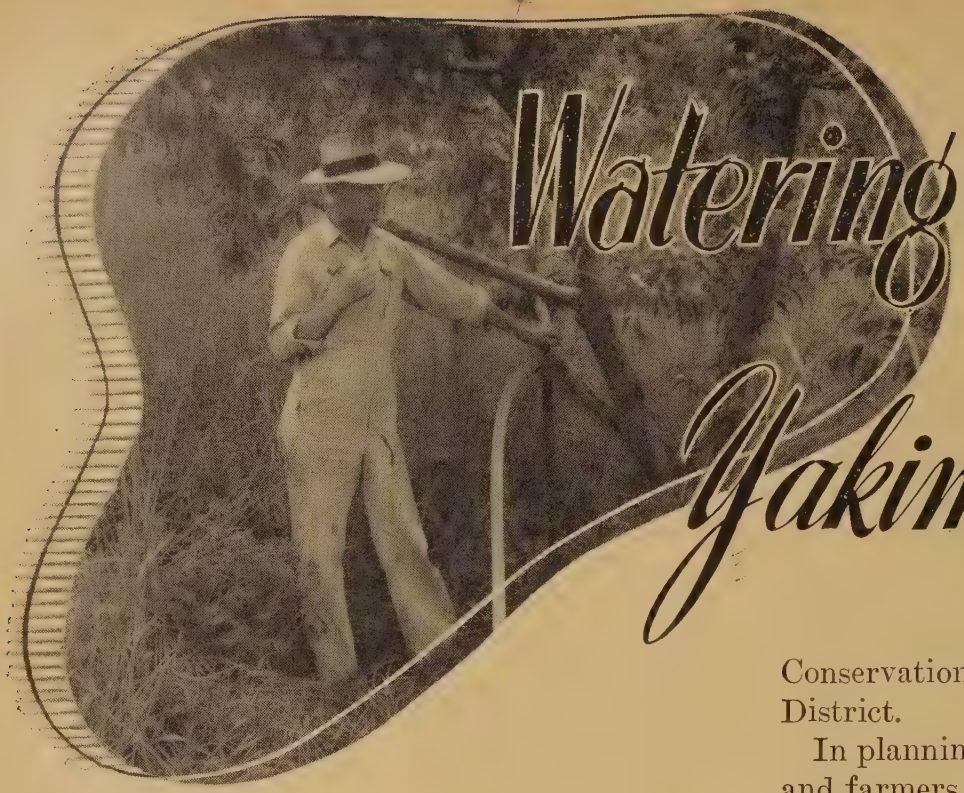
The three nurseries visited show conclusively that district nurseries are (1) highly successful, (2) that they can be operated without high subsidization, (3) that they can produce both seedlings and transplants at low prices, and (4) that results from planting are much better than those from trees produced in distant nurseries.

School forests and woodland marketing cooperatives are two means of encouraging tree planting within the district. These are novel ideas, both of which mean more business for the district nursery.

The South Muskegon Soil Conservation District boasts 30 school forests; the West Ottawa District 19, and the North Muskegon District 12. Size varies from 40 to 160 acres, the average being about 80 acres. Students, under the guidance of regular teachers, plant thousands of trees annually that are furnished free by the district nursery. The Holland School Forest is an excellent example. In its 12 years of operation, students have planted almost 100,000 trees. Some now are over 16 feet tall. More than $500 worth of Christmas trees cut in thinning operations from this school forest were sold during the 1945 Christmas season. The funds were used to buy more land to enlarge the school forest so that the students can plant more trees from district nurseries. The Holland school has constructed a very fine log cabin in its forest. Provisions have been made for preparing hot lunches and sheltering the tree planters. Near the log cabin are forest tree nursery seed and transplant beds that have been planted and cared for by students. Here they are taught to grow their own trees, care for them, and transplant them in the field.

The West Ottawa Cooperative Marketing Association was formed to encourage conservation practices in marketing woodland products. To date, most of the work of the association has been in the marketing of Christmas trees from plantations. District cooperators are instructed what trees to remove for Christmas trees without harming the plantations.

The Michigan story can be duplicated anywhere in the United States where soil conservation district directors can give to tree nurseries the attention that is requisite.



Watering Orchards in the Yakima Valley

Cecil Clark (above) operates sprinkler system in peach orchard from standpipe located at base of tree out of the way of tillage operations.

By ALLAN W. McCULLOCH and TED BOWMAN

THE STATE of Washington produces approximately one-sixth of this country's apple crop. Peaches, apricots, cherries, and grapes are also important fruit crops. Except for small areas, all of these fruits are irrigated.

Because of favorable climatic conditions, a high percentage of the fruits are grown on moderately sloping to steep lands. Being on sloping lands, the soils are generally limited in depth.

Furrow irrigation, straight down the hill, except for minor acreages, has been the only method of irrigation of these lands. Even with the best of care, the soil washes. Distribution of water between the upper and lower parts of the orchard is poor. The top gets too much water while the bottom suffers from having too little.

In the Yakima Valley, fruit growers, as well as other farmers and ranchers, met their erosion problems by organizing five soil conservation districts in rapid succession: Ahtanum Soil Conservation District, East Benton Soil Conservation District, Hi-Land Soil Conservation District, Roza Soil Conservation District, Wenas Soil Conservation District.

In planning their programs, district supervisors and farmers of the districts pointed out the major need for improved irrigation practices.

Sprinkler irrigation is the ideal method of applying water to sloping lands. You can design the system to get very even water distribution to all parts of the orchard. Also, you can apply it like a gentle rain, so that the soil takes it all in. Then when the soil reservoir is full, you shut it off.

It takes some careful planning, however, to be assured that the sprinklers will give these results on all types of soils and still be within production-cost limits.

Technicians of the Soil Conservation Service working with the soil conservation districts in the valley have taken this approach. They contend that sprinkling must be well planned and sufficiently economical to become an established practice.

To date, 18 systems have been planned as part of complete farm conservation programs in the Hi-Land Soil Conservation District; 5 in the Roza Soil Conservation District; 37 in the Wenas Soil Conservation District; 2 in the Ahtanum Soil Conversation District; and 5 in the East Benton Soil Conservation District. Each system is designed to fit the soil's intake and moisture-holding capacity and provide plant moisture throughout the season.

Two brothers, Cecil and Ted Clark, in the Roza Soil Conservation District, have installed sprinklers on 80 acres. They are going ahead as rapidly as they can get the materials on their remaining 340 acres of peaches, cherries, apples, and pears.

NOTE.—The authors are, respectively, head, regional irrigation section and district engineer, Soil Conservation Service. Portland, Oreg., and Yakima, Wash.

Careful head control to individual furrows in a mature peach orchard. Six hundred furrows are irrigated with 1.0 second-foot flow of water. Note good cover crop which is combined with good irrigation practices to eliminate erosion on the Cecil Clark property.

Clark says he has completely done away with soil washing, uses less water, and obtains higher yields. His spraying and harvesting operations have been made easier and more efficient with the elimination of furrows in his orchards.

Paul Dodge, located in the Moxee area of the Ahtanum Soil Conservation District, has a complete farm plan for his 72 acres of new irrigated land. If surface irrigation methods were used he would have water sufficient for only 52 acres. Now, with a properly designed sprinkler system, he will be able to irrigate the full 72 acres and will be assured of a good cover crop on lands which would otherwise erode for several years.

On the Harold Dobe farm in the Wenas Soil Conservation District, 1½ acres were sprinkled

last year. Serious erosion was halted, water was saved and production increased. Dobe now is going ahead with plans to put the entire 80 acres under sprinkler irrigation next spring and will establish a permanent cover crop at the same time. A good portion of Dobe's farm was eroding badly last year.

Leo M. Hansen, in the Ahtanum Soil Conservation District, put 18 acres of seriously eroding orchards under sprinklers this year. Under surface methods Hansen had neither the water nor the time to cover all of his orchards. On this tract are wide variations of soil types. This season Hansen was able to irrigate the entire area with sprinklers without erosion. A schedule was worked out, varying the time that the sprinklers were operated on the several soil types, as a part of his conservation farm plan. Not only has soil erosion by irrigation water been completely eliminated, but an average of 30 percent of the water used by furrow methods has been conserved.

A new crop is being sprinkled in the East Benton District. On the Rollo Lanning farm, 0.2 acres of Concord grapes was sprinkled this year on a trial basis. The results are very satisfactory to date and promise to provide information required to extend this practice to a large acreage. This trial will be continued in 1947.

"Contour" or controlled-gradient irrigation of hillside orchards and vineyards on favorable sites is another conservation irrigation method used in the area. In the Roza Soil Conservation District 8 acres of this type of irrigation were laid out in the spring of 1946. An additional 50 acres is planned for 1947.

Even on gentle slopes where downhill furrows can be used, conservation irrigation is needed. The length of the furrows and the head turned into them must be adjusted to prevent erosion or over-irrigation with its resultant drainage and alkali problems.

Good cover crops not only help maintain soil fertility and control erosion, but also play an important role in providing the soil with the means of taking in irrigation water.

On the orchard lands of Washington and on other irrigated lands of the West, conservation irrigation is bringing about a new era in irrigated agriculture.

Five Years of Soil Conservation Biology

By WALLACE L. ANDERSON

SEVENTY-FIVE percent of the farm conservation plans of the Upper Mississippi Region (Wisconsin, Minnesota, Iowa, Illinois, Missouri, Michigan, Indiana, Ohio) now call for the establishment of practices particularly beneficial to wildlife. These are in addition to changes in land use, crop rotations, pasture improvement, woodland management and other conservation measures helpful to wildlife. This shows progress. Five years ago there were fewer than 2,400 farmers who had prepared farm conservation plans in 53 soil conservation districts, in the Upper Mississippi Region. On July 1, 1946, more than 45,000 farmers in 353 districts had applied, or were in the process of applying, complete farm conservation plans on 7,157,000 acres of land. The number of plans is now 18 times what it was 5 years ago.

In 1941 there were about 2,300 acres planned specifically for wildlife use. Five years later 57,500 acres had been planned for wildlife.

Strip cropping, a practice known to double the number of ground-nesting birds, was applied to more than 500,000 acres of cropland during the 5 years.

Although labor was scarce, farmers in soil conservation districts did an outstanding job of tree planting. During the war years they planted more than 32,000 acres of trees and shrubs in odd areas, gullies, shelter-belts and on eroded areas being converted to woodland.

In a day and age when fence-rows are not looked upon with favor by many farmers, cooperators in soil conservation districts in the southern part of the region received enough multiflora rose to plant more than 200 miles of living fence. Thus, the modern fence-row becomes a part of the wildlife community on well-managed farms.

Streambank management—useful for erosion control and valuable for wildlife—was limited because of the large amount of labor and materials required. Even so, farmers in soil conservation districts applied the practice to more than 2,500 acres, which represents about 625 miles of protected streambank.

The number of farm ponds constructed by farmers jumped from 200 in 1941 to 5,700 in 1946. These are not "water holes," but properly designed ponds, fenced to exclude livestock and, in most cases, are further developed for wildlife by plantings of legumes, grasses, shrubs, and conifers. Water from these ponds is usually piped to a tank outside the pond area to supply livestock. More than 2,200 of these ponds were stocked with palatable fish supplied by the United States Fish and Wildlife Service and State conservation departments.

Soil conservation district governing bodies are showing more and more interest in the wildlife aspects of soil conservation. So are other public agencies. Seven State conservation departments are supplying planting stock to farmers. One State has gone into large-scale production of multiflora rose. A State university and a State conservation department have started pond management studies in cooperation with districts. Two States are cooperating with soil conservation districts in carrying out Pittman-Robertson development projects. In another State, the extension biologist is working closely with districts.

Several colleges, universities, and conservation departments are cooperating with soil conservation districts in the region on marsh management studies, streambank erosion control projects, submarginal land purchase, fence-row studies, educational work, and similar activities. Thus the soil conservation district proves an effective vehicle through which farmers and various State and Federal agencies can work together to increase farm wildlife and contribute to a vitally necessary soil conservation program.

Sprinkler IRRIGATION OF GRAPES

Section of vineyard where sprinkler demonstration was conducted. Main line from pump appears in background between first and second rows. Lateral with sprinkler heads can be seen on top of fourth row. Data was taken on five rows which included two on each side of lateral. Conventional furrow method of water application was used on the rest of the vineyard.

BY OTTO F. SCHNELLHARDT AND LINN L. TINSMAN

THERE are many places in the State of Washington where the planting and growing grapes on steep, very sandy or shallow soils would be feasible and practical were it not for the fact that rill irrigation causes overuse of water and presents an erosion hazard. This has led to many requests for information on this type of irrigation being received by technicians of the Soil Conservation Service of Kennewick.

Sprinkling of vineyards seems not to have been tried on a commercial basis in Washington. It was tried, however, on an experimental basis on a 2-acre vineyard in 1946 by the Wenatchee Tree Fruit Experiment Station. The report was favorable.

Rolla Lanning presses button to start sprinkler. Small meter under switch measures current consumed. That's Lanning's daughter, Blanch, eyeing the operation.

Some sprinkling of vineyards was done in California also, but there is danger from mildew in the more humid areas. Less danger of this sort was observed in California where the grapes were

NOTE.—The authors are work unit conservationists with the Soil Conservation Service at Yakima and Kennewick, Wash.

sprinkled, and the foliage and fruit allowed to dry before sundown. In the dry climate of Central Washington there would probably be less likelihood of mildew. And frequent winds would tend to dry grapes rapidly.

Grape growers are reluctant to try sprinkler irrigation because of such hazards as scalding, cracking, shattering of young clusters and other mechanical or disease injuries. Obviously, there was an urgent need of an improved method of irrigating grapes on steep, sandy, or shallow soils. It was decided to find out if sprinkler irrigation could be used under these conditions.

During the spring of 1946 contacts were made with various implement companies, individual grape growers and others interested in sprinkler irrigation of grapes. Rolla Lanning, who lives 5 miles southeast of Kennewick and has a farmer-district agreement with the East Benton Soil Conservation District, was interested in working out this problem. His sandy soil is planted to grapes. Lanning agreed to furnish an area of mature Concords for the demonstration.

Implement companies in Seattle and Pasco agreed to furnish the pump, motor, pipe, and sprinkler heads. An electric power company offered to furnish poles and wire to the pump site. The help of research workers of a grape juice company at Kennewick and of the Soil Conservation Service at Prosser was also invoked. It was late July before all equipment had been delivered and installed. The first sprinkling was started August 2. Previous to this time the grapes had been irrigated by the rill method. The test area consisted of five rows of grapes 160 feet long and 45 feet wide for the coverage of one lateral of sprinklers.

It is realized that the 1946 observations are very incomplete. They will be continued throughout the 1947 irrigation season to get more information on the effect of sprinkling during an entire season. The results from the preliminary observations, nevertheless, are very encouraging. Apparently there was no damage to the fruit, foliage or vines by the use of overhead sprinklers. The sprinkled area tested 2 percent higher in sugar content and the production on this area was equal to that of the rill-irrigated area. This higher sugar content may have been due to other factors than sprinkling.

Apparently the grapes were not damaged by overhead sprinkling at any time. There was no scalding of fruit, foliage, or vines. The fruit did not crack or shatter. It remains to be seen if there will be any ill effects from an entire season's sprinkling, especially when the grapes are in bloom, forming clusters or setting fruit.

Results from this demonstration should be applicable to a very large surrounding area. The soil, widely typical, is class III, Ephrata Sandy loam, 20 to 30 inches deep, underlain with a calcified cobblestone subsoil.

The following table condenses some of the data:

Date sprinkled	Time (hours)	Pressure (pounds)	Number of sprinklers (size)	Current used (kw.-hr.)	Gallons (water)	Total equivalent rainfall	Penetration (inches)	Weather degrees F.
8-2-46	4.5	[1] 32	(13/16) 5 (4 7/32)	([2])	7,800	1.3	8.5	
8-9-46	7.0	38	5	36	16,100	2.31	12	95 clear.
8-16-46	5.5	36	5	12	12,600	1.7	12	96 hot.
8-22-46	4.0	32	5	16	9,100	1.16	8	92 clear.
8-29-46	5.0	34	5	20	11,300	1.55	12	80 cloudy.

[1] Pressure not constant due to adjusting pump and motor.
[2] Meter not installed for first irrigation.

From the foregoing summary it appears that the best rate of application would be approximately 1.5 inches of rainfall per irrigation. This could be reached with the installation used in the demonstration at 30 pounds pressure for about 5 hours. The discrepancy in the number of kilowatt-hours used and the number of gallons of water delivered at various times was due to adjusting of the pump and motor to obtain greater efficiency for the particular sprinkling set-up.

The sprinkler heads were placed 40 feet apart to insure complete coverage. The line was placed on the top of the posts in the grape row. The pipe was 2-inch galvanized portable, in 20-foot lengths with risers 6 inches high. A single-phase 3-horsepower motor was used and Columbia Irrigation District water was pumped from a riser. Single nozzle undertree sprinkler heads were used in applying the water. Apparently, a larger size nozzle could be used satisfactorily on this type of soil, applying the water in a shorter time without danger of puddling and reducing the rate or evaporation.

Since water was available for only one sprinkler line, no definite pattern was obtained. The main purpose of the demonstration was to determine the effect of sprinkler irrigation on the grape plant.

Against the Wind

Looking at this wealth of crop-insurance in a fallow strip subsurface tilled, are George Harmon (left), district conservationist of the Soil Conservation Service, and Roland Roberts, Nebraska farmer.

By A. E. McCLYMONDS

THE MOST effective, and cheapest, insurance against soil blowing is subsurface tillage (stubble mulch farming) combined with wind-strip cropping. This is the firm belief of farmers in the Horseshoe Bend area in western Nebraska, who have 90 percent of their cropland wind strip cropped, with most of it subsurface tilled. And they light no stubble fires, for burning is a thing of the past.

Bounded on the east by sharp-tipped Chimney Rock, and crowding against Wildcat Range on three sides, the 20,000 acres in Horseshoe Bend lie alongside the historic Oregon Trail.

Today, some of the best wheat in Nebraska is grown there. Wheat yield in the area averaged 40 bushels per acre this last season and the farmers say that the average would have been higher if there had been no hail damage a year ago. This average yield was obtained on land which, during the drought, blew away to plow depth, and even this year there was damage on unprotected land. This is quite in contrast to the period from 1931 to 1939 when not one profitable crop of wheat was raised, when wind-blown soil buried fences, and when large quantities of soil were lost forever.

Originally in good prairie grasses, much of the land was broken up for crops in 1910 to 1912.

NOTE.—The author is regional conservator, Soil Conservation Service, Lincoln, Nebr.

Wind strip cropping on the farm of Ben Roberts, Jr. Dark strips are growing wheat, light strips are fallow with good cover crop residue left on top by subsurface tillage operations. Contour strips in background are on the Frank Jessup farm.

Roland Roberts looks at crop residue still on surface in June, following wheat crop of year before. Outlying buttes of the Wildcat Range in background.

Early yields ran quite low, only 10 to 15 bushels.

In 1926 summer fallow was tried, using the moldboard plow and disk harrow, and yields climbed. The soil began to rip loose, as block farming left wide areas for the wind to take a good bite. The plow and disk harrow left the soil wide open to attack by the wind. It was also common practice for the farmers to burn off the stubble, thus destroying crop residues that would have helped hold the soil against the wind and at the same time increase its moisture absorbing capacity. These things, combined with drouth, caused many fields to be abandoned in the "dust bowl" of the 1930's.

Ben Roberts, who has lived in Horseshoe Bend since 1899, when he built a log cabin there, says, "In wet years we could get by with plowing, but most of the time stubble mulch farming and strip cropping are necessary if we are going to stay in the wheat-raising business. Conservation farming is the cheapest insurance we can carry."

Ben Roberts' sons, Bill, Roland, and Benny, Jr., who took over the farming when their father retired, are cooperators with the First Commissioner Soil Conservation District, as are 13 other farmers in Horseshoe Bend. Complete farm conservation plans have been developed for them with assistance from Soil Conservation Service technicians.

Some contour strip cropping is being used on Roland Roberts' farm. As to this, he comments, "Contour farming on the rolling land shows up well, especially in the yield of feed crops."

Flood control is a serious problem as water rushes down from the surrounding hills during heavy rains. Following farm conservation plans, water-spreading systems have been developed and diversion terraces built to lead the run-off into natural drainages which can carry it without damage.

About 400 acres of less-productive land have been seeded to crested wheatgrass.

According to George W. Harmond, district conservationist for the Soil Conservation Service in Scottsbluff, wind strips with alternate wheat and fallow, are from 8 to 18 rods wide and are crosswise to the prevailing winds. A good cover of crop residue is left on the surface of the fallow land by using one-ways, subsurface tillage tools such as rod weeders, and subsurface sweeps. These tools loosen the soil for seedbed, cut off weed roots, and do a tillage job; all beneath the crop residues. The residue, remaining on top, reduces tendency of the soil to blow, slows the escape of moisture from the surface, allows rainfall to be more quickly absorbed, provides protection for seedlings when they are young and delicate, and gradually decomposes to be mixed with the soil as humus.

Conservation farming shows its value even in good years. While there was no wind damage this year in Horseshoe Bend, several fields of wheat in a similar area over the hills to the west were blown out last winter and had to be replanted this spring. Crops were quite spotty there, but in Horseshoe Bend the yields were quite uniform.

Horseshoe Bend farmers of today have not forgotten the drouth years; but they are not afraid

(*Continued on page 262*)

REVIEWS

THE LAZY GARDENER. By William C. Pryor. Longmans, Green & Co. New York. 1946. 226 pp. Illustrations.

Most books on gardening are for postgraduates of trowel and spraygun. The Lazy Gardener, on the contrary, is for duffers. And there are an awful lot of duffers fussing around with shrubs and flowers and vegetables.

Gardens are farms in miniature. Town and suburban dwellers often graduate from an interest in gardening to an interest in land programs. That is one reason why Bill Pryor's book has importance to readers of this magazine.

Gardening's usual purposes are to feed, to tan, to toughen, to offer relaxation, and to make life and landscape beautiful. Bill Pryor furthers all these aims in The Lazy Gardener, with special emphasis on relaxation. His methods save soil, increase production, broaden the scope of personal enjoyment.

By following the author's intelligent albeit easy philosophy, enough minutes and hours can be salvaged from the muscle work to read his book and to ponder it—a pleasant and profitable pastime. The Lazy Gardener advocates deliberative activity. It takes some of the pressure off the boys with a hoe. As with trout fishing, some of gardening's highest dividends are the intangibles. This book invites a happy, adventurous approach while admitting the sweaty, toilsome aspects of the sport of growing onions and tomatoes. It makes clear the point that a "lazy" gardener is not a loafer per se but, rather, a wise, contemplative and superior artisan. It bursts wide open many of the orthodox, ritualistic "do's" and "don't's" of the usual manuals.

You can start reading anywhere, for there's a chuckle per page. The tone throughout is that of a friendly backfence neighbor, the kind who smokes a pipe and always has at the tip of his tongue a pertinent reminiscence or useful tip. Bill Pryor's fictional style carries over into the monthly "notes" which appear in sequential order in companionship with the first 12 chapters. For instance, the "Notes for January" are as chatty reading as the chapter "Why Bother with a Garden," which they follow.

The Lazy Gardner is a good ecologist who works always with nature. His common sense extends to the use of common names for plants in preference to the official latin. When Mrs. Coverleigh loftily inquires as to why he doesn't grow *Lilium giganteum* and *L. lancifolium*, gardener Bill wearily explains, "I'm keeping a garden for my own fun, not maintaining a horticultural museum." Bill likes mulches and leafmold. He stresses a good seedbed for vegetables but he finds many opportunities in his woods and elsewhere just to, more or less, let things go—with pleasant results. The author is a jealous guardian of soil, a conservationist by profession and by personal practice.

Jessie Robinson's delightful drawings fit the text. The jacket, reproducing in colors her sketch for chapter 2, Gardening in Bed, is calculated to catch the roving eye and stir the risibilities.—Wellington Brink.

TWO BLADES OF GRASS. By T. Swan Harding, University of Oklahoma Press, Norman, 1947, 352 pp. illus. Price $3.50.

The subtitle of this book is "A History of Scientific Development in the U. S. Department of Agriculture." The history is limited strictly to scientific development and research and does not go into the activities of the Extension Service, Agricultural Adjustment Agency, Bureau of Agricultural Economics, War Food Administration and similar programs with which a large part of the Department's efforts has been concerned in the past few years. This is a tremendous job which has needed doing for a long time. Apparently, it was waiting for a research man who was sufficiently articulate to accomplish the task. I am sure that no member of the Department's staff will read this book without an inward glow of satisfaction at being connected with an organization which has had such a tremendous impact on the agricultural economy of our country. At the same time one is brought to realize the extremely delicate balance among climate, plants, soil, diseases, insects, and animals and man under which most of our food and clothing and a large part of our shelter are produced. I do not believe that anyone can read this book and then ask the question which is asked too often: "When are you going to finish your research?" The author has taken particular pains to evaluate each research development. The total benefits are enormous in comparison with the cost. In other words the cost is so little in relation to the benefit that we cannot afford to be without it. Another slur that is often cast on the research work of the Department is that a project once started goes on forever. Several examples of projects which have been finished and closed are cited; for example, the project for the production of silk was closed in 1908 but almost had to be reopened by popular demand in 1941 when our relations with Japan became strained.

The first Federal appropriation for agriculture was $1,000 which was included in the bill for the 1840 census and established the Agricultural Division of the Patent Office. In 1847, just 100 years ago, the appropriation had increased to $3,500. The Agricultural Division continued in the Patent Office until 1862 when it was given independent bureau status with Isaac Newton as Commissioner. He was responsible for the statement about two blades of grass growing where but one grew before from which the title of this book is derived. In 1889 the Department was given full executive department status with a Cabinet officer instead of a Commissioner.

The greater part of the book is devoted to an account of the outstanding achievements of the various bureaus and the men who made them. Wiley's development of the first food and drug act, Howard's work with insects, Whitney's work with soils, Pinchot's work in forestry, Orton's work in plant breeding, and Dorset's development of hog cholera serum are only a very few of the many examples. In order to hold the volume to a reasonable size it must have been necessary to do a tremendous amount of screening. I was surprised to note that John R. Mahler, Samuel Fortier, and Lyman J. Briggs, to name a few omissions that come to mind, were screened out in view of some that were retained but it would be very difficult to get any two people to agree on where the line should be drawn.

The research and regulatory activities of some of the agencies which originated in the Department but have since been transferred elsewhere are discussed at some length. Among these are the Weather Bureau, Public Roads, Biological Survey, and Food and Drug Administration. The Hatch Act which aided the establishment and maintenance of the State agricultural experiment stations was passed in 1887. This led to the setting up of the Office of Experiment Stations in the Department. The Department and the stations working together have solved many problems which would have been difficult if not impossible for either to have solved alone. The need for working even more closely together has been emphasized by the Research and Marketing Act of 1946.

The subject of soil conservation is covered in considerable detail. The early work of Bennett in calling attention to the evils of soil erosion and eventually leading to the development of the Soil Conservation Service is reviewed. The author has a greater appreciation of the need of saving our land than many agricultural writers. The last sentence of his chapter on soil conservation illustrates his feeling on this subject. "Unless we retain the good soil and the great waters are conserved, the vine will not put forth branches nor yet will it bear fruit."—H. E. Middleton.

VERSATILE PLANT.—Multiflora rose is coming into use as a hedge and living-fence plant. Planted at 1-foot intervals in a single row, the plant forms a dense, head-high shrubby fence that is easy to maintain, does not spread, and will confine livestock. Its wildlife value is not the least of its attributes. The Missouri Conservation Commission reports that Jack Stanford, Commission technician, walked along a multiflora rose planting this spring, "only a quarter of a mile in length, and observed 53 bobwhite quail feeding and chuckling under protective covering; 7 cottontail rabbits sunning themselves; 1 woodchuck excavating a fresh spring den; 1 red fox digging into some field mice burrows; and a number of field sparrows, meadow larks, and mocking birds criss-crossing the vegetation. The quail were feeding about 50 feet from where the fox was digging and a rabbit was resting a few feet from the last-destroyed mouse nest."

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COMPILED BY WILLIAM L. ROBEY

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FARMING AGAINST THE WIND

(*Continued from page 260*)

to meet similar conditions, should they come again. They know much soil moisture is being stored in these years of generous rainfall and that the soil is being anchored against blowing.

They will readily tell you that it does take a little more time and trouble to do a good job of conservation farming, but that it pays off in wheat harvest and also provides soil security, a cheap but very practical form of insurance.

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Such Contributors as These ~

E. C. McARTHUR

President, National Ass'n of Soil Conservation District Governing Bodies.

R. Y. BAILEY, agronomist of kudzu fame.

DR. H. C. BYRD

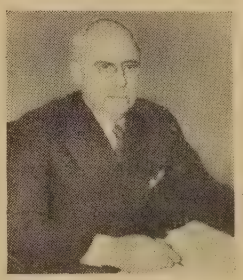
President, University of Maryland.

DR. W. A. ALBRECHT, Chairman, Department of Soils, University of Missouri.

HON. GEORGE T. MICKELSON

Governor of South Dakota.

DR. FIRMAN E. BEAR, Chairman, Soils Department, New Jersey Agricultural Experiment Station.



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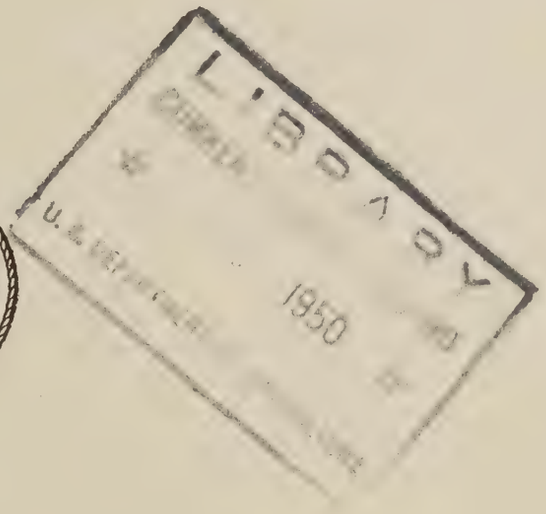

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